



ADDICTION AND ECOLOGY

HOW INTOXICATION CULTURE KILLS OUR PLANET

An Anthology about Intersections of Toxicity, Colonialism, Dependency, and How to Heal:
Decolonizing Addiction and Sobriety; Responding to the Latest Research about the Effects of
Pharmaceuticals on Animals, their Habitats, and Animal Rights; Learning from
Temperance Activism; Native Resistance; and Documenting Radical Straight Edge Environmentalism

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Arc of Justice Angel Press

2022

Editing, Introduction, and Conclusion by Phoenix X Eeyore N© 2022.

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Note 2: The DIY approach of this anthology reflects a combination of zine culture and science (call it “zinience” if you will). Share knowledge; enable total access for everyone; expose people to a wide variety of views and data; spark debate; incite (socio-ecological) experiments and action; and figure shit out together. Paywalls and other corporate-academic barriers hinder science, innovation, trans-class collaboration, and our general welfare. Give credit to authors and laborers but place it all in a bigger perspective: we have multiple, critical, global and local crises and we need to share vital knowledge and insights immediately in order to address the addictions, pollutions, systemic processes, and industries killing animals, species, habitats, plants, waterways, and vital ecologies.

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Foreword

by Barton Baxter, Ph.D.

Academia is failing us horribly.

Our planet is literally going down in flames with little except rising ocean levels and increasing floods to quench them. Disaster follows disaster. Dissonance and denial march along right beside them. Academic experts, politicians, and mainstream media fail to respond accordingly. Very few scholars follow the example of Rose Abramoff (and others in Scientist Rebellion) risking their job to take a stand.

A key reason to the gross neglect may be that the people who consume the most (including academics who drink beer, eat meat, and jet-set from conference to conference) cannot seem to quit their own addictions and they choose to ignore it.

Guess what that means for research: We see almost no work that focuses on the many and diverse connections between addiction and ecology.

Anthologies exist on almost every topic you can think of. Academics have put out anthologies about TV series, boring authors (lots of those), obscure and pointless theories, technical developments (even more of those), and some academics just can't stop writing about "free will" (I guess they have no choice)...

But an anthology on two vitally connected fields that are essential to our survival?

Nope.¹

The amount of research on the corona pandemic alone since 2020 (to say nothing of what comes out on new medications each year or "safe" ecological topics such as climate-related research) completely dwarfs all of the assembled research on the intersection of addiction and ecology since the beginning of time. Of course, there's a shit ton of work on addiction and another shit ton of work on ecology. But why not their intersection?

You can find anthologies in English on addiction and cultural studies,² addiction and feminism,³ addiction, poetry, and madness,⁴ addiction and mental health,⁵ addiction and opioids,⁶ addiction and recovery,⁷ drugs and the American dream,⁸ addiction and

¹ If you do a search for "ecology" and "addiction" you'll probably find a number of hits but they will almost exclusively relate to studies about addiction that take an "ecological" approach (by looking at the *social* environment that leads to addiction). See, for example, Darin Weinberg, "Toward an Ecological Understanding of Addiction," in *Evaluating the Brain Disease Model of Addiction*, 373-383 (New York and London: Routledge, 2022).

² Janet Farrell Brodie and Marc Redfield, eds. *High anxieties: Cultural Studies in Addiction* (Berkeley: University of California Press, 2002).

³ Claudia Bepko, ed., *Feminism and Addiction* (New York: Haworth Press, 1991); Nan Van Den Bergh, ed., *Feminist Perspectives on Addictions* (New York: Springer, 1991).

⁴ Mark S. Bauer, ed., *A Mind Apart: Poems of Melancholy, Madness, and Addiction* (Oxford: Oxford University Press, 2009).

⁵ Lloyd I. Sederer, ed. *Current Controversies in Mental Health and Addictions: An Expert's Anthology* (Cognella, Incorporated, 2017).

⁶ Jaynie Royal, ed., *Howling Up to the Sky: The Opioid Epidemic* (Pact Press, 2018).

⁷ Lily Dunn and Zoe Gilbert, *A Wild and Precious Life: A Recovery Anthology* (Unbound: 2021).

spirituality,⁹ addiction and the Jewish community,¹⁰ addiction and horror stories,¹¹ addiction and Lacan,¹² and multi-authored textbooks on addiction and counseling¹³ and addiction, drugs, and the brain.¹⁴

You can find even more anthologies in English on ecology (too many to list even a fraction here). They range from deep ecology¹⁵ to “eco-poetry”,¹⁶ from ecology and witchcraft¹⁷ to ecology and racism,¹⁸ from ecology and disability studies¹⁹ to ecology and Deleuze and Guattari,²⁰ from ecology and feminist Marxism²¹ to ecology and masculinity,²² from ecology and Jewish literature²³ to ecology and Italian literature.²⁴ In other words, almost everything you can imagine.

But what will you *not* find? No “Addiction and Ecology” anthology.

It has become a minor trend to talk about “energy sobriety” but God forbid that anyone (especially the Pope) ever talk about *actual* sobriety. Hell, even Mormons don’t do this type of research. So, despite the highly unorthodox character of this anthology, it hopefully kicks off a conversation for a world of academic addicts still in denial and another world of activists ready to put the pieces together for long overdue multi-issue collaborations.

Here’s why I endorse this anthology and how I see it fulfilling key purposes:

1. We need research on addiction and ecology yesterday. We need research that addresses both crises simultaneously and with an eye toward solutions.

⁸ Patricia A. Adler, Peter Adler, and Patrick K. O’Brien, eds., *Drugs and the American Dream: An Anthology* (New York: John Wiley & Sons, 2012).

⁹ Merle R. Jordan and Oliver Morgan, eds., *Addiction and Spirituality: A Multidisciplinary Approach* (Des Peres, MO: Chalice Press, 2012).

¹⁰ Stephen Jay Levy and Sheila B. Blume, Eds., *Addictions in the Jewish community* (Federation of Jewish Philanthropists of New York, Inc., 1986).

¹¹ Mark Matthews, et al. eds. *Garden of Fiends: Tales of Addiction Horror* (Wicked Run Press, 2017); Mark Matthews, et al. eds. *Lullabies for Suffering: Tales of Addiction Horror* (Wicked Run Press, 2020).

¹² Yael Goldman Baldwin, *Lacan and Addiction: An Anthology* (New York: Routledge, 2018).

¹³ W. Miles Cox, and Eric Klinger, eds. *Handbook of Motivational Counseling: Goal-based approaches to assessment and intervention with addiction and other problems* (West Sussex: John Wiley & Sons, 2011).

¹⁴ George F. Koob, Michael A. Arends, and Michel Le Moal. *Drugs, Addiction, and the Brain* (Amsterdam: Academic Press, 2014).

¹⁵ Alan Drengson and Yuichi Inoue eds., *The Deep Ecology Movement: An Introductory Anthology* (North Atlantic Books, 1995).

¹⁶ Ann W. Fisher-Wirth and Laura-Gray Street, eds. *The Ecopoetry Anthology* (Trinity University Press, 2020).

¹⁷ Robin Artisson, ed. *Letters from the Devil's Forest: An Anthology of Writings on Traditional Witchcraft, Spiritual Ecology and Provenance Traditionalism* (Createspace Independent Publishing Platform, 2014).

¹⁸ Robert D. Bullard, ed. *Confronting Environmental Racism: Voices from the Grassroots* (Cambridge, MA: South End Press, 1993).

¹⁹ Stacy Alaimo, ed. *Disability Studies and the Environmental Humanities: Toward an Eco-Crip Theory*. (Lincoln: University of Nebraska Press, 2017).

²⁰ Bernd Herzogenrath, ed. *Deleuze/Guattari & Ecology* (New York: Palgrave Macmillan, 2009).

²¹ Ariel Salleh, ed. *Ecofeminism as Politics: Nature, Marx and the Postmodern* (Zed Books Ltd., 2017).

²² Paul M. Pulé and Martin Hultman, eds. *Men, Masculinities, and Earth: Contending with the (m)Anthropocene* (Cham, Switzerland: Palgrave Macmillan, 2021).

²³ Ari Elon, Naomi Mara Hyman, and Arthur Waskow, eds. *Trees, Earth, and Torah: A Tu B'Shvat Anthology* (Philadelphia: Jewish Publication Society, 2000).

²⁴ Patrick Barron and Anna Re, eds. *Italian Environmental Literature: An Anthology* (Italica Press, 2003).

2. If the Internet is good for anything, it's this: the unhindered sharing of information. If it's digital, there should be no paywall for information whatsoever. Especially not information related to our personal and collective well-being.
3. Not all academics have been sleeping on the job. Those featured here have done their homework and deserve more attention for what they've done.

What are some obvious downsides to releasing an anthology like this? There's no actual expert peer review assembling the pieces together. It could have benefitted from professional editing (sorry, I didn't have time to help them out). So yes, it's rather scattered, often roughshod and polemical, and often reads more like a fanzine than an academic anthology. But it seems like that is part of the point. (I don't even know if it's legal and I don't know if I want to know).

But all that really means is this:

1. Regarding reliability and peer review: you may have to make your own decisions about the validity of what you read. Ostensibly most of the articles herein all passed some sort of peer review but to quote the already tired cliché: "do your own research!"
2. Regarding readability: pick out the parts that you can (or want to) read and focus on them. Make it useful for yourself and your community.
3. Regarding any other downsides: Make a better one yourself!

All I know is this: we need to talk a lot more about addiction, sobriety, and ecology. This anthology does that much. May readers do the rest.

Stay sober, stay revolutionary.

1 Introduction: Intersectionalities of Addiction, Ecology, and War

Addiction and ecology seem to have a huge, powerful, and intoxicatingly intimate connection. Climate change denialism recalls the insistence of someone that “a little alcohol each day is good for you,” even while repeated inebriation has wrecked their life. People often turn a blind eye to the ravages that palm plantations bear upon orangutan habitats (while palm oil greases junk food’s addictive taste and texture simultaneously oiling the cogs of corporate profits). The mechanical and apocalyptic locust plague of consumerism seems as mundane and routine as watching a friend take their daily smoke, antidepressant, or painkillers: simply part of life. Or so it would seem. As with child trafficking where intoxicants absolve the conscience of the perpetrators and weaken the defenses of the children trafficked (Wood 2020), addiction intersects with ecology in ways that we do not often notice but happen around us somewhere all of the time.

Addiction, whether to gasoline or nicotine, whether to alcohol or online gaming, whether to patriotism or physical orgasm, seems to have a persistently insidious effect on global consumption, social tensions, and the spiral of destruction that results from—and feeds into—a system that trains a multi-billion captive audience and work force into a manic craving for that next fix. Addiction seems everywhere: About half (47%) of Americans “showed signs of at least one behavioral or substance addiction disorder in any given year in the early 2000s. Often they showed signs of more than one” (Courtwright 2019: 2). It has gotten worse. “The nature of addiction has implications—more precisely, temptations—for businesses that sell habituating products. One is to encourage early and frequent consumption. [...] addiction and its precursor, heavy consumption, remain indispensable profit centers for a range of global businesses” (Ibid).

Look at the trash on the ground of whatever city you live in and ask if it looked like something that a person *needed* (improving their health) or if it likely fed a craving leading to more cravings, worse health, and more plastic on the ground to choke and contaminate animal life and plants for centuries to come. Most pollution—including the ones we ingest and inhale—hardly meet our eye. Yet tobacco kills *8 million people per year*—compared to about 7 million who reportedly died of COVID over a *3-year span* (WHO 2022). Air pollution kills 9 million people a year (Burnett *et al.* 2018). *93% of the world’s children breathe toxic air every day* (WHO 2018). Industry has *reduced the total flying insect biomass by 75%* in the last 27 years alone (Hallmann 2017). Addiction fuels a war of terror against our shared eco-systems. And profit drives addiction. All of this seemed obvious. In fact, Ted Kaczynski (aka the Unabomber), famously remarked on a link between addiction and ecology:

Imagine an alcoholic sitting with a barrel of wine in front of him. Suppose he starts saying to himself, “Wine isn’t bad for you if used in moderation. Why, they say small amounts of wine are even good for you! It won’t do me any harm if I take just one little drink....” Well you know what is going to happen. Never forget that the human race with technology is just like an alcoholic with a barrel of wine.²⁵

²⁵ The *Washington Post* published his manifesto “Industrial Society and Its Future” on 22 September, 1995.

Although I found Ted's methods deplorable (ostensibly defending nature from civilization's assaults by terrorizing essentially regular people and workers), his analogy here seemed spot on. To me, the analogy fit even more precisely when addressing any type of consumption that explicitly preyed on a person or group's addictive desires and habits. If technology feels addictive, what then of tobacco or alcohol? But it took me a long time to realize that not everyone feels that way. In fact, some people actually refute this view.

Therefore, to explicitly lay out the *counter*-argument of this volume, we can present a claim made by Santiago Gomez (from the vegan anarchist straight edge band Sleep Furious) who made the case that addiction does not deserve special consideration in relation to ecology:

...there are bands, zines and soap-box aficionados who have labored long and hard to "politicize" straight edge²⁶ through anti-capitalist and/or animal liberation aspects, emphasizing the corporate greed that drives tobacco, alcohol and drug industries, as well as the cruel animal-testing that the commercial manufacture of these substances entails. However, as I have said earlier, I feel that as much as I sympathize with the aims, these linkages are simply too crude, propagandish and superficial to be meaningful; they seem arbitrary—even capricious. The realities of both capitalism and vivisection offer no empirical basis whatsoever for singling out tobacco, alcohol and (particularly) illegal drugs for special treatment. Simply put, *every single product we purchase*, be it tofu, Star Wars figurines, non-alcoholic beer or [cigarettes], entails wide-scale environmental destruction, the death of countless animals (in fields, testing facilities, or both) and continued support for the machinations of capitalist exploitation (Kuhn 2010: 275).

According to this view, nothing separates addictive (or *more* addictive) products/services from non-addictive (or *less* addictive) ones. The very tenet seems implausible: how could more addictive products *not* prove a greater threat and danger to ecological equilibrium than less addictive ones? Nonetheless, I have yet to see anyone meet this argument head-on. For example, generalist discussions that pit biocentrism (ecology-centered worldviews) against anthropocentrism (human-centered worldviews) do not address the specific distinction between addiction and non-addiction in relation to ecology. Within vegan straight edge anarchist scenes, we hear these types of perspectives:

With climate change, the depletion of topsoil, the killing of ocean life, and the displacement of indigenous people and the destruction of their land, I'd say the greatest issues are the ways in which capitalism, and all of industrialized civilization, is devastating this planet and everything on it. Our society as we know it could not exist without deforestation, strip mining, industrial agriculture, and the exploitation of the poor. [...] Straight Edge cannot be considered the final goal, but in order to achieve the things that count the most, we must use it as a tool.

-Eva "Genie" Hall of Gather (quoted in Kuhn 2019: 26).

²⁶ Straight edge = abstinence from cigarettes, drugs, alcohol, and, usually, promiscuous sex.

Riotous Incognitx: I feel that the struggle against civilization for total liberation necessitates an uncompromising fight against speciesism and intoxication culture. Were there any specific life events that led you both to personally embrace vegan straight edge?

xBALACLAVAx: Surely. For us, vegan sxe [straight edge] means the struggle against capitalism and its shackles that imprison us in life, so our ideas are based on total liberation, with rejecting the civilized cultures that have been imposed since our establishment. All estrangement which we had believed was deconstructed through our vegan sxe vision. We were living a life of illusion, until we learned from hardcore/hip hop, straight-edge, animal liberation, earth liberation and anarchism in general.

-Interview with xBALACLAVAx, “Vegan Straight-Edge Anarchy in Brazil” (printed in *Riotous Incognitx* 1, 2017: 2).

Alcohol has played a key role in the epidemic of fascism, racism, statism, imperialism, colonialism, sexism and patriarchy, class oppression, religious superstition, and all of the other products of hierarchical authority that has swept the earth over the past few millennia. It continues to play that role today, as people of the whole world, finally universally domesticated and enslaved by globalized capitalism, are kept pacified and helpless by a steady supply of spirits. These spirits squander the time, money, health, focus, creativity, awareness, and fellowship of all who inhabit this universally occupied territory—“work is the curse of the drinking classes,” as Oscar Wilde said. It’s not surprising, for example, that the primary targets of advertising for malt liquor (a toxic byproduct of the brewing process) are the inhabitants of ghettos in the United States: people who constitute a class that, if not tranquilized by addiction and incapacitated by self-destruction, would be on the front lines of the war to destroy capitalism.

- Black Flag Sobriety Program (printed in *Straight Edge Resistance* zine, 2017 by Feral Space).

Arguments against addictive substances or services subsequently tend to revolve around a few common positions such as:

- (1) Sobriety means resisting enslavement, dependency, colonialism, and genocide of indigenous peoples. Whether in inner cities, on Native reservations, in the restaurant industry, sports clubs, construction sites, trucking industry, agricultural communities, or suburbia, addiction destroys human lives and sobriety rejects corporate profiting from human suffering;
- (2) Sobriety enables people to better connect with animals, nature, and our own emotional landscape thereby overcoming the alienation of modern civilization;
- (3) Sobriety enables activists to better build bridges and link their solidarity with a diversity of people and organizations for whom sobriety feels particularly pertinent;
- (4) Sobriety improves people’s cognitive and social abilities to function in daily life and more effectively organize revolution;

- (5) Sobriety requires and promotes the self-discipline, self-control, empathy, patience, and resistance to short-term gratification which all help sustain personal autonomy and viable community.

All of these points may have validity. They may also point toward indirect effects of addiction on ecology and they may all bear relevance to social and eco-justice movement struggles, none of them address the specific question of how addiction *directly* relates to ecology and how that toxic relationship, in turn, serves as a key propellant in the juggernaut of civilization which ravages our planet. Therefore, it seems reasonable for us to begin with something very small: the humble cigarette butt. What human has not seen one? What animal (or human animal) has not at some point consumed some toxic remnant byproduct of a cigarette butt that contaminated a natural habitat or food and water supply *somewhere*? A few facts about cigarettes and their butts:

Cigarette butts are the most commonly discarded piece of waste globally and are the most frequent item of litter picked up on beaches and water edges worldwide. [...] It is possible that tobacco product waste may also prove to be a significant environmental contaminant and potential human health hazard through bioaccumulation in the food-chain. [...] Electronic cigarettes may contain batteries that require special disposal as well as chemicals, packaging and other non-biodegradable materials. [...] Tobacco smoking leads directly to the emission of 2 600 000 tonnes of carbon dioxide and about 5,200,000 tonnes of methane. [...] One estimate of the impact of deforestation in tobacco agriculture and curing is that it causes almost 5% of global greenhouse gas production (Novotny *et al.* 2015).

Now, if we can acknowledge that much ecological impact and habitat devastation due to only one addictive substance, tobacco, then how much more impact and devastation might we attribute to other addictive substances, industries, and habits? Imagine another tiny example of, for example, alcohol use in its intersection with air travel. A small but significant percentage of airplane crashes result from alcohol²⁷ (resulting in the ecological damage at random crash sites, the resources and energy required to clean up and dispose of the crash remains as well as to care for any survivors, and finally, to build and replace the destroyed aircraft). Again, extrapolate the ecological consequences of any given addiction from guns to gambling, from Internet to heroin, from electricity to antidepressants with any given occupation, habitat, relationship, vulnerable species, or geographic location and one might begin to fathom the depth of ecological impacts. Hopefully, by the end of this volume, the following shall seem much clearer to all readers:

Addiction comes not only in the form of addictive substances but also addictive services (such as transportation, gambling, prostitution, cell phone use, or pornography).

²⁷ “Due to intensified education programs and policy interventions, the prevalence of alcohol involvement in fatal general aviation accidents has decreased considerably in the past four decades, from over 30% in the early 1960s to about 8% in the 1990s. It is noteworthy that alcohol-related accidents are largely limited to general aviation. Alcohol as a contributing factor has not been implicated in any fatal accident of U.S. major airlines and in less than 3% of fatal commuter air carrier and air taxi accidents” Guohua Li, et al. “Alcohol Violations and Aviation Accidents: Findings from the U.S. Mandatory Alcohol Testing Program,” *Aviat Space Environ Med.* 78, no. 5(2007): 510–513.

Furthermore, addiction drives consumerism, animal exploitation, racism, patriarchy, and environmental destruction in ways that permeate societal institutions and traditions while blinding us to its effects (even when we might otherwise have felt sober enough to notice). Addiction occurs primarily through civilizational societies that deprive people from their natural needs. Various industries profit from such deprivation (e.g., substandard wages) and/or the supply of addictive substances or services (which people consume in lieu of meeting actual needs). Addictive industries typically inflict direct harm on animals, eco-systems, plants, and habitats through the mining, testing, production, storage, distribution, consumption, maintenance, and disposal that their manufacture and use implies. From cigarette butts in waterways to car fumes, from cartel cocaine labs to alcohol-related industrial waste, from fossil fuel's carbon emissions to the impact of the weapons industry on local and foreign habitats: addiction fuels social and ecological destruction; sobriety can help heal it.

War and Ecology

War takes place on many levels and in many forms. The most spectacular forms of nuclear assaults and even conventional bombardment with missiles, bombs, drones, rockets, mines, and grenades have the most obvious effect of ecologies as they indiscriminately wipe out animals and forests, pollute rivers and lakes, destroy vital infrastructure such as buildings, bridges, train tracks, power plants, and roads (requiring excess energy, emissions, and resources to re-route, repair, and replace). Yet the environmental impacts of war and war industries seem less obvious. In the words of Sue Wareham “the human and environmental costs of war are so far-reaching that a full examination of them would produce countless volumes” (Branagan 2013: 10). From the mineral extraction required to produce materials for the war industry to the electricity required to run military bases; from the habitat destruction that takes place each time a government builds a base to the damage and energy waste of testing and drills; from the paper consumed and used to dispense information within and outside the military for purposes of advertising, recruiting, and investigating to the corporate meat-based diet supplied to soldiers whose ultimate work culminates in more destruction (completely avoided through non-military resolutions). How about all of the drugs soldiers take in order to sustain extreme training, exercises, and war? Drugs which pollute through their fabrication, transport, disposal, and contamination of waterways through their release in urine? It goes on and on.

Finally, these overt symbols of war disguise the less obvious mechanisms of war such as banks, border controls, international NGOs, global regimes (such as WTO, IMF, and the World Bank), and government institutions that exert influence or coercion in order to sustain an unequal system. This “silent war” in the background ensures the maintenance of mass hunger for hundreds of millions of people and a life of miserable precarity for billions more. This war ensures that those suffering deprivation will prioritize immediate needs over broader ecological concerns. It also feeds into a narrative of “poor people” as a problem through excessive population growth even while the bulk of ecological problems stem from the consumption and activities of the U.S. and the EU (even while, for example, displacing their local ecological footprint by subcontracting production for their consumption to places like China). This war looks a lot like revised robber barons paying middlemen to do their dirty work and slyly slip them their drugs under the table. All the while, eco-systems and working peoples pay the highest costs for these deals of duplicitous dependencies.

Furthermore, not only does militarism and war cause, by far, the most extreme damages to human and ecological contexts, those perpetuating such wars (politicians, military officials, and their financiers) re-appropriate the language of war against domestic populations in a so-called “War on Drugs” which re-positions already warped and violent displays of patriotism against fellow citizens as if certain segments of the population cause most societal ills, not the politicians and police fighting them.

Turning the crisis into a “war on drugs” makes it difficult to separate addiction from the battleground in which it is embedded. For many, this battle is, indeed, real—but I do not believe it is entirely clear what the foe is. Are we fighting the symptoms or solving the problem? As Bruce Alexander (1997: 3) suggests that while the ‘war’ is in actuality being waged (by government officers, politicians) such military terminology is inappropriate to social issues. “War mentality,” he tells us, “suspends normal human compassion and intelligence” (Fish 2009: 12).

The recent response to the pandemic and the “War on the Virus” (and the subsequent panic mode responses that seemed to suspend “normal human compassion and intelligence”) falls in line with this impulse to defer to “war mentality” when, in fact, militaristic thinking and structures create the most fundamental problems our world faces.

And so we see brutally entwined intersections of power, addiction, domination, and destruction: countries with excessive affluence (such as the EU and the U.S.) both maintain and promote domestic high-consumption lifestyles all while consuming vital resources and polluting intensely in order to maintain and promote the military industrial complex that will sustain this unequal state of affairs.

Can you picture this conundrum? Personal and societal addictions overlap and reinforce one another. They both (a) fuel excess consumption, militarism, destruction and pollution of air, water, and soil as well as (b) blind participants in their drunken stupor to this very fact, blind them/us to any means of rectifying it, and obscure the consequences it bears upon everyone—animal, plant, and human alike—who remain out of sight and beyond their borders of consideration and compassion. Sobriety, therefore, resolves multiple issues at once: improving one’s health, personal and shared economy as well as improving shared ecological welfare, sobriety also better prepares us and enables us to address the many challenges before us now and that lie ahead. We can do this. But not without facing up to key issues of addiction along with the violence that initiated it and the violence it continues to reap. It can begin with breathing. It can begin with awe. It can begin by continuing to breathe as we face our fears, as we die to our previous lives, and as we reunite with the very world we struggle to nurture and defend.

Toward a Theory of Addiction and Ecology?

Subsequently, against this backdrop, it seems stunning that even in work devoted to holistic approaches of defending eco-systems from civilizational assaults, we find nothing about addiction or sobriety. Whether in Michael Watts and Richard Peet’s *Liberation Ecologies* (1996), Leonardo Boff’s *Ecology and Liberation* (1995), Carolyn Merchant’s *Radical Ecology* (2005), or almost anything written about degrowth in the last 15 years, issues of addiction and sobriety receive marginal-to-zero attention (usually the latter).

Even in a theory as purportedly comprehensive and radical as “total liberation” we see very little on the topic. Steven Best gave it no more than a side comment in *The Politics of Total Liberation*: “It is a well-known fact that the more ‘advanced’ a society, the higher its rates of alcoholism, drug abuse, suicide, mental illness, depression, job dissatisfaction, crime, murder, divorce, and so on” (Best 2014: 145). David Pellow gave a few marginal mentions of addiction-related issues in *Total Liberation* (2014) but did not directly connect addiction to ecology. For example, he noted drug addiction dynamics in relation to social movements such as how drug use by an Earth Liberation Front activist, Jacob Ferguson, enabled police to pressure him into collaborating as a police informant (Pellow 2014: 224). In a similar vein, David quoted long-term incarcerated activist Dhoruba Bin-Wahad:

The police used the drug dealers as their network against the black underground. They would tell them, “look, you’re not dealing any drugs here unless you give us what we want.” So they would use their network of drug dealers and informants in order to get information on the Black Liberation Army... We, the Black Liberation Army, the underground in the black community, had a policy of anti-heroin interdiction. ...So we would try to identify where they hung out, where their processing places were, and we would knock them off. The most heinous drug dealers, of course, we would have to try to make an example out of. I can’t go into that (Pellow 2014: 292; footnote 79).

David also mentioned Walter Bond as a straight edge animal liberation activist and briefly quoted MOVE with a paragraph that mentioned drug addiction (2014: 195; 40). Interestingly, MOVE from Philadelphia seems like one of the few groups who associated addiction with ecology and they did so back in the 1970s. John Africa, the primary founder of MOVE, extended the Golden Rule to all forms of life: “Because of the respect John Africa teaches us to have to have for all life, we treat *all* life like we would want to be treated” (Janine Africa, circa 2001: 10). And that meant rejecting drugs and other addictions. As John Africa put it: “Drugs are enslaving and to respect drugs is to endorse slavery; this is what every revolutionary must understand.” John Africa’s nephew, Frank Africa wrote to the court in 1981:

People that are caught up inside this system are constantly attempting to run from this deceptive booby trap. Running from an automobile accident to a bar in attempt to forget. The bar that chases folks to the hospital in seek of relief, the hospital that is only an introduction to the coffin, while this problem still remains and gets worse. [...] The burdensome strain that causes drug addiction, money addiction, whiskey addiction, television addiction, rape addiction, fashion addiction, murder addiction, and more. Running from one problem to the next in search of the relief that science can never provide. [...] From a stick of candy to a stick of marijuana to a stick of dynamite. From soda to beer, to whiskey to medicine. A vacation trip that’s boring without a drug trip, the drug trip that sets the mood for a suicide trip to make the vacation permanent.

In other words, addictions deprived people of their autonomy and made them both dependent and disoriented by the very system that kept people oppressed in other ways. Yet MOVE did not limit their view of addiction to a minority of addicts or specific

substances. They deemed all of society as addicted and technology as a core addiction. As Edward Africa wrote: “Technology is opposed to life and poisons life. MOVE is opposed to technology, people have had technology forced on them until they’ve become addicted to it, dependent on it, taught to place value in it when in reality technology is slowly polluting, poisoning, distorting life” (Edward Africa, 1994: 9). Implicit here—and I’d like to make it explicit—we can see a structural approach to addiction. In other words, we very much need to stop viewing addiction as solely an individual or personal crisis and start recognizing the structural components and work towards exposing and changing them alongside personal and local community struggles.²⁸

We can see this type of perspective elsewhere by scholars who discuss addiction. For example:

Addiction Fetishism Individualizes Addiction as a Personal “Disease”

Perhaps one of the greatest flaws of the medicalized construction of addiction lies in its methodological individualism, that is, the tendency to focus on individual experience to the exclusion of social context. It might be said that the prevailing views amount to an “addiction fetishism” in which the behavior of an addicted person is seen as though it was isolated from the social, cultural, and historical circumstances that produced it. Not unlike Marx’s notion of commodity fetishism that sees commodities as having an existence independent from the social circumstances of production, so too addiction fetishism is a mode of thought that alienates the personal experience of addiction from the broader social forces that contribute to its development. Thus, addiction fetishism makes an abstraction of actual people that is analogous to the abstraction of the commodity. By abstracting the conditions of production, commodity fetishism and addiction fetishism obscures the actual

²⁸ This falls in line with the basic tenets of “liberation psychology.” For example: “A central theme of liberation psychology is the need to focus on the collective rather than the individual [...] Liberation psychology thus focuses on oppression and liberation at the structural level as well as at the level of individual lives. As Martín-Baró (1994) argues, the root causes of oppression lie in the structures—political, economic, and cultural—and ideologies that underlie oppressive social conditions. These structures and ideologies create the everyday experiences of violence, poverty, stress, discrimination, and prejudice that are manifestations of oppression. Liberation will therefore ultimately involve transformation of oppressive social structures, which can only occur through collective action. [...] Another important element of liberation psychology is the understanding of internalized oppression as an important element in maintaining oppression, and of the essential interlinkage between the social conditions of oppression and the psychological patterns associated with oppression. Psychological patterns such as sense of inferiority or helplessness that are associated with oppression clearly have their origins in social conditions of powerlessness and degradation. Such psychological patterns act as a barrier to action and are part of what maintains oppression. Thus liberation must involve transformation of the psychological patterns as well as the social conditions associated with oppression. [...] Liberation psychology requires, then, an analysis of the social conditions in which people live their lives, an understanding of internalized oppression, and a set of practices or interventions that will transform psychological and social patterns associated with oppression. It is grounded in the specific experiences of the group or context in which it is developed, and thus the analysis offered by a liberation psychology, and the processes and practices that facilitate liberation, will vary from one context to the next. There can be an Irish liberation psychology, a Puerto Rican liberation psychology, a black liberation psychology, a liberation psychology for lesbians and gay men, and so forth” (Moane 2003: 91-92). Although I’ve yet to hear of an “addiction liberation psychology,” the general approach, without using the name, seems fairly common. In other words, addressing addiction by looking to change not only personal thinking and habits but emphasizing the change of structures (e.g., advertising, accessibility, harm reduction, social norms, alternatives, etc.).

social realities, social inequalities, and social conditions of production... The ideology of addiction as an individual disease, the underlying assumption of addiction fetishism, constructs an illusory form of equality and individuality. Addiction fetishism places an emphasis on individualism without individuality, on a sense of humanism without humanity, and on biology without ecology. Addiction fetishism envisages addiction as an “equal opportunity disease” without addressing the reality that not everyone has the same opportunity to develop an addiction. Like commodity fetishism, addiction fetishism reduces humans to abstractions i.e., the disease metaphor, who are then dominated by those abstractions, never really questioning the social basis of the reified categories or the circumstances of their lives that contributed to addiction.

[...] From this more global perspective, solving addiction cannot be accomplished by treating people for their “disease”. In fact, the reification of addiction as a disease, a concept that is fundamentally lodged in liberal, free-market thought, i.e., that individuals are sovereign entities existing independent from social and cultural conditions within which they are embedded, may even be part of the problem. As Alexander argues, addiction can’t be “treated” away in the conventional sense. Treatment, while beneficial for some, may do more to further mystify addiction by reducing it to individual pathology and by proclaiming that treatment experts are the single best source for effective recovery. Nor can we punish away addiction! [...] Prisons are warehouses for individuals considered to be threats to society. [...]

Perhaps increased attention to the contextual factors associated with addiction will not only contribute to better understanding of how conditions present in a person’s life course can develop into an addiction, but also contribute to a less demonized view of drug use and addiction. Such a perspective might lead to a normalization of addiction within modern society, one that focuses more attention on widespread social transformation. Perhaps then we could make greater progress in the area of recovery, and turn more prisons into hotels and conference centers (Granfield 2004: 29, 33).

Addiction as Racialized Code for Ethnicity

By the turn of the twentieth century, the association of Chinese immigrants with opium smoking was old news. Reports of the British Opium Wars of the 1840s and a steady stream of sensationalized, journalistic descriptions of American and Chinese “opium dens” had long confirmed the relationship of the Chinese with opium use for many Americans. What was different at the end of the century, however, was the slow proliferation of more properly “scientific” theories that sought to explain the growing phenomena of habitual drug use among all races of Americans. Chief among these was the “addiction” concept, a term that physicians began using sometime around 1900. Most of the new “addicts,” who had become steadily more visible after 1870, weren't Chinese, nor were they opium smokers. They were instead morphine, cocaine, or heroin users and many of them had become “addicted” through the care of physicians who sought to allay any number of maladies by the hypodermic injection of narcotic drugs. But despite the presence of new drugs and new users, the association of Asian otherness with drug use and its effects persisted in the turn-of-the-century debate surrounding narcotic addiction.

Scholars of the American drug problem have often noted that *fin de siècle* narcotic experts linked addiction with race. For instance, medical historian David F. Musto notes that “the southerner’s fear of the Negro and the Westerner’s fear of the Chinese” shaped American responses to a growing “drug problem.” In a similar vein, David T. Courtwright

argues that changes in the demographics of the addict population, including race, led to the 1914 passage of the Harrison Anti-Narcotic Act, the nation's first federal anti-narcotic legislation.

[...] I hope to begin a reexamination of the interplay between drugs and race in American culture by exploring several examples of turn-of-the-century, anti-Asian racism as it was embedded in the medical literature of narcotic addiction. The explanations of narcotic addiction disseminated in these texts did more than simply state that Chinese people used opium. Their writers continued these older associations but also surpassed them by suggesting that the threat held by the use of opium and its derivatives was addiction, an affliction that menaced white drug users with a reduction to the "condition" of the Chinese. This condition was comprised of many elements but its mobilization as a description of the predicament of being "addicted" had the effect of converting the practice of narcotic use into the manifestation of an inner state—into the expression of a hidden truth about the user. The use of race as a metaphor for addiction helped to shift the discourse of addiction away from the description of practices and moved it instead toward the investigation of essences.

[...] The insistence upon Oriental otherness opened a path through the confusing tangle of ideas that problematized the explanation of narcotic addiction to the lay public. It provided a means for these writers to explain the otherwise nebulous threat of addiction that they found hanging over the heads of their white, bourgeois readership. This operation also served, however, to describe people other than narcotic addicts. This essay, therefore, confronts a logic whose easy circularity was perhaps its most vicious feature. Narcotic addiction experts, who often argued that to be an addict was to be like the Chinese, further implied that to be Chinese was to be like an addict (Hickman 2000: 71).

Addiction Results from Capitalist Exploitation of World

Addiction is a vital constituent of capitalism that has been adopted and accepted as an essential way of life in the Western world. While effectively supporting a non-participatory relationship with the rest of the natural world, capitalism has come to define much of what we know as Western culture—even to the detriment of human sanity and environmental integrity. [...] It is clear to me that Capitalism, along with the free market economy, encompasses an addictive economic system that is based on the need for excess—goods, profit, and consumer goods demands. It is, therefore, no stretch of the imagination to consider that the West has, over the past two to three hundred years, totally embraced an addictive way of life. If the populace is addicted to "things" there is no need to care or worry about how these "things" are made, where they come from, or who or what was exploited in order to produce them. Likewise, cocaine users are rarely, if ever, concerned about the political and social implications that growing cocaine has for the people of Colombia. While some consumers are now becoming more aware of the conditions and consequences of cheap oil and manufactured goods, there is still a large consumer demand for these products. This overwhelming "need" in the West for non-essential consumerables, with the ensuing loss of personal well being, increasing environmental degradation, and the loss of native land based lifestyles world wide, does, I believe, qualify as addiction, as much as the misuse or abuse of drugs or alcohol (Fish 2009: 2-3).

Addiction as an Amorphous, Omnipresent, and Existential Question

In search of answers, I immersed myself in the field, studying the psychology and neuroscience of addiction. I wanted to find the right definition—the correct and tidy medical theory that would explain it—but I was soon overwhelmed. The field seemed to be in chaos. Scientists and other scholars seemed bitterly divided, always talking past one another. Some insisted that addiction was primarily a brain disease. Others claimed that this brain-centric view blinded us to the psychological, cultural, and social dimensions, including trauma and systems of oppression. Few other fields of medicine are so powerfully driven by cultural bias and ideology.

Then, as I continued my research into addiction, I noticed something interesting. The broadest-thinking and most creative scholars kept making odd and intriguing connections to fields beyond my usual horizons. They drew on ancient philosophy to clarify the problem. They looked to sociology to show how it is impossible to separate addiction from its cultural context, now and for generations back. They even delved into theology, to trace how legacies of thinking about morality have powerfully influenced the way we think about choice and responsibility. In a short time, I became absolutely convinced that medical science alone, while important, was insufficient for understanding addiction. Understanding addiction in the present required looking to the past. Addiction seemed to be everywhere and at every time.

We have long wielded the concept of addiction as a weapon, using it to wage war—not just “on drugs” but on people who use drugs. I was struck by how long societies have feared the corrupting forces of technology, from opioids and smartphones and porn-on-demand to syringes and telegraphs and sugar. It was clear that addiction was not just an issue of medical science but also one of identity, power, commerce, and fear—as well as one of devotion.

[...] This ...is the story of an ancient malady that has ruined the lives of untold millions, including not only those of its sufferers but also the lives touching theirs, and yet it is also the story of a messy, complicated, and deeply controversial idea, one that has eluded definition for hundreds of years. Addiction doesn’t just cut across time and place; it cuts across fields far beyond medicine and science, to politics, spirituality, law, economics, philosophy, and sociology—not to mention all the literature and art that point toward the ineffable gaps between. Addiction is a brain disease, a spiritual malady, the romantic mark of artistic sensibility, a badge of revolution against a sick society, and all of these things at once. [...]

What does addiction mean to you? Everyone has a preconceived notion. Do only drug and alcohol problems qualify, or can you be addicted to gambling, sex, eating, work, or even love? Is it a matter of severity, like drinking or using too much, or is it driven by how you feel, some internal sense of being run out of control? Is everyone somewhere on the addiction spectrum—does not being able to put down your phone count?—or is it a clearly demarcated disease, neatly partitioned off from normal society? The point is not that these questions have easy answers, but that these are not purely scientific or medical questions; they are inextricable from our most closely held, culturally contingent, and often implicit beliefs and values. Questions about additions are questions about what it means to be human (Fisher 2022: xii-xv).

Addiction as a Form of Personal and Intergenerational Trauma

If you want to understand addiction, you can't look at what's wrong with the addiction; you have to look at what's right about it. In other words, what's the person getting from the addiction? ...What addicts get is relief from pain, what they get is a sense of peace, a sense of control, a sense of calmness, very, very temporarily.

And the question is why are these qualities missing from their lives, what happened to them? If you look at drugs like heroin, like morphine, like codeine, if you look at cocaine, if you look at alcohol, these are all painkillers. In one way or another, they all soothe pain. And that's why the real question in addiction is not, 'Why the addiction?,' but, 'Why the pain?'

...My definition of addiction is any behavior that gives you temporary relief, temporary pleasure, but in the long term causes harm, has some negative consequences and you can't give it up, despite those negative consequences. And from that perspective, you can understand that there are many, many addictions. Yes, there is the addiction to drugs, but there is also the addiction to consumerism, there is the addiction to sex, to the internet, to shopping, to food.

The Buddhists have this idea of the hungry ghosts. The hungry ghosts are creatures with large empty bellies and small, scrawny necks and tiny little mouths, so they can never get enough, they can never fill this emptiness on the inside. And we are all hungry ghosts in this society, we all have this emptiness, and so many of us are trying to fill that emptiness from the outside and the addiction is all about trying to fill that emptiness from the outside.

Now, if you want to ask the question of why people are in pain, you can't look at their genetics. You have to look at their lives. And in the case of my patients, my highly addicted patients, it's very clear why they are in pain: because they have been abused all of their lives, they began life as abused children. All of the women I have worked with over a 12-year period, hundreds of them, they had all been sexually abused as children. And the men had been traumatized as well. The men had been sexually abused, neglected, physically abused, abandoned and emotionally hurt over and over again. And that's why the pain.

And there is something else here too: the human brain. The human brains itself... develops in interaction with the environment. It's not just genetically programmed. So the kind of environment that a child has will actually shape the development of the brain.

...it's a myth that drugs are addictive. Drugs are not by themselves addictive, because most people who try most drugs never become addicted. So the question is, why are some people vulnerable to being addicted? Just like food is not addictive, but to some people it is; shopping is not addictive, but to some people it is; television is not addictive, but to some people it is. So the question is, why this susceptibility?

What happens to people that they need these chemicals [dopamine, endorphins] from the outside? Well, what happens to them is, when they are abused as children, those circuits don't develop. When you don't have love and connection in your life, when you are very, very young, then those important brain circuits just don't develop properly; and under conditions of abuse, things just don't develop properly. And their brains then are susceptible when they do the drugs: now they feel normal, now they feel pain relief, now they feel love. And as one patient said to me: "When I first did heroin," she said, "it felt like a warm soft hug, just like a mother hugging her baby"... we pass it on, we pass on the trauma, and we pass on the suffering, unconsciously, from one generation to the next.

[...]And then we look at the drug addict and we say to the drug addict, ‘How can you possibly do this to yourself? How can you possibly inject this terrible substance into your body that may kill you?’ But look at what we are doing to the Earth. We are injecting all kinds of things into the atmosphere and the oceans and the environment that is killing us, that’s killing the Earth. Now which addiction is greater? The addiction to oil, to consumerism? Which causes the greater harm?

In the *New York Times*, on June 9th, there was an article ...about a man called Nísio Gomes, a leader of the Guarani people in the Amazon, who was killed last November . . . because he was protecting his people from the big farmers and the companies that are taking over the rainforest and destroying the rainforest and that are destroying the habitat of the native Indian people here in Brazil.

And I can tell you that coming from Canada, the same thing has happened over there. And many of my patients are actually First Nations Indian people, native Indian people in Canada, and they are heavily addicted. They make up a small percentage of the population, but they make up a large percentage of the people in jail, the people who are addicted, the people who are mentally ill, the people who commit suicide. Why? Because their lands were taken away from them, and because they were killed and abused for generations and generations.

But the question I ask is, if you can understand the suffering of these native people and how that suffering makes them seek relief from pain in their addictions, what about the people who are perpetrating it? What are they addicted to? Well, they are addicted to power, they are addicted to wealth, they are addicted to acquisition. They want to make themselves bigger.

...so a real sense of insecurity and inferiority. And they needed power to feel okay in themselves, to make themselves bigger, and in order to get that power, they were quite willing to fight wars and to kill a lot of people, just to maintain that power... power, the addiction to power, is always about the emptiness that you try and fill from the outside. And Napoleon, even in exile on the island of St. Helena, after he lost his power, he said, ‘I love power, I love power.’ He couldn’t think of himself without power. He had no sense of himself without being powerful externally.

And that’s very interesting when you compare it to people like the Buddha or Jesus, because if you look at the story about Jesus and Buddha, both of them were tempted by the devil and one of the things that the devil offers them is power, Earthly power, and they both say no. Now why do they say no? They say no because they have the power inside of themselves, they don’t need it from the outside.

And they both say no because they don’t want to control people, they want to teach people. They want to teach people by example and by soft words, and by wisdom, not through force; so they refuse power. And it’s very interesting what they say about that...

And so as we look at this difficult world with the loss of the environment and global warming and the depredations in the oceans, let’s not look to the people in power to change things, because the people in power, I’m afraid to say, are very often some of the emptiest people in the world, and they are not going to change things for us (Maté 2022).²⁹

²⁹ Note: I do not aim here to engage in a lot of academic back-and-forths about definitions and theories but it seems worth noting that Gabor Maté, a hugely popular speaker on addiction, has received critique. For example, Stanton Peele wrote “Unfortunately, however, Maté is fundamentally proposing a reductionist

Addiction as a Result of Dislocation from Clan and Community

Although a person in any society can become dislocated, “free market” societies inevitably dislocate their members, rich as well as poor, from traditional family, community, and religious ties. This is done in order to create and maintain a free-market in labour, land, currency and consumer goods which allows an unencumbered pursuit of individual and corporate wealth.

[...] Even the most repellent substitute lifestyles are adaptive as substitutes for psychosocial integration. For example, membership in a violent youth gang, offensive as it may be to society and to the gang member’s own values, is far more endurable than no identity at all. Even the barren pleasures of being a street “junkie” transient relief from pain, the nervous thrill of crime, pariah status—are less painful than the unrelenting depression and aimlessness of dislocation. Whenever substitute lifestyles are the best adaptation that people are able to achieve, they cling to them with a tenacity that is properly called “addiction” in the traditional sense of that term in the English language—whether drugs are involved or not.

The English word “addiction”, from its ancient beginnings to the present, has denoted a state in which a person’s life is given over to a single pursuit, or a narrow range of pursuits, to the detriment of a broader, more balanced lifestyle.

vision of addiction, where abuse history and posited biochemical changes are now the essential causes of people's self-destructive action. It is not enough to say that this model is highly conjectural. It also isn't true, that is, it makes little sense of the data. Vincent Felitti conducted a huge epidemiological study on early childhood experiences. He found that only a tiny group (3.5 percent) of people with four or more adverse childhood experiences became involved in injection drug use. So Maté's model is highly indiscriminating. The percentage of addicts increases somewhat with the number of adverse experiences. Even so, this relatively minor elevation in no way presupposes the damage is caused biochemically, rather than simply by detrimental psychological consequences and deeply dysfunctional homes and environments. According to the National Institute on Alcohol Abuse and Alcoholism, three-quarters of people who were at one time alcohol- dependent fully recover, the large majority without treatment, many without ceasing to drink. In fact, at the deepest level, Maté's views limit our approaches to, our understanding of, and even our respect for people living with addiction. Rather than expand our understanding of addiction, his views harm our ability to respond to it. For one thing, focusing solely on one risk factor and one very questionable source of addiction has led Maté to posit a potential *cure* for addiction, Ayahuasca, a brew made from South-American *spirit-vine* that is claimed to open the human consciousness for a higher degree of introspection. In fact, Maté's reliance on this treatment further confuses levels of analysis. Does introspection really remedy the absence of neuro-receptors in some straightforward manner? In this context, that harm reductionists embrace Maté is extremely troubling. For, contrary to popular beliefs in these circles, Maté is actually diverting the addiction field from a more comprehensive and practicable view of addiction. Maté's embrace of Ayahuasca does not support the broad harm reduction goals of expanding the resources available to people with addictions like those in Vancouver, of developing their skills for functioning in their worlds, and of holding up the hope that they can improve their lives. Instead, this approach is reductive, monosyllabic, and really no different than the disease camp's fool's gold quest for an addiction vaccine in the forlorn hope that we can remedy addiction without improving human lives" (Peele 2011). Personally, I see a merger of the critique and Gabor's perspective by the other quotes which view all people as traumatized in some way by colonialism, detachment from nature, and severance from healthy communities and meaningful labor.

[...] The more inclusive, older sense of the word “addiction” fits reality better, since there are no important differences in behaviour or experience between people who are addicted to drug use and those who are addicted to other pursuits and since there is no convincing evidence that using any drug causes people to use it addictively in the future.

Because western society is now based on free-market principles which mass-produce dislocation, and because dislocation is the precursor to addiction, addiction to drug use and to other substitute life styles within western society is not the pathological state of a few, but, to a greater or lesser degree, the general condition.

Because free-market society increasingly provides the model for globalization, addiction is becoming more and more prevalent everywhere on earth, along with the English language, the Internet, and Mickey Mouse.

Of course, addiction can occur in any society, including pre-modern and non-western ones. For example, alcohol addiction was widely prevalent in the USSR, which did not have a free-market economy. This may be because Soviet society shared with free-market society the willingness to destroy traditional relationships within families, communities and religions in the interest of economic development (Alexander 2000: 502-504).

“Addiction” as a Misleading Term to Describe a Person’s Response to Unsustainable Constraints or Coerced Lack of Meaning

Addiction derives from the Latin *addictus*, a term used in ancient Rome to indicate a state of slavery (Oxford English Dictionary, 2008). [...] By clarifying the origin of the definition, it is noted that underlying the world of *addiction* a vision prevailed, in which the center of the attention was not the person as a whole, but the substance or behavior that brought the same person to repeat their conduct

[...] Currently, psychology and psychiatry should avoid being trapped within the techno-scientific *Weltanschauung* (worldview) that mainly includes the results that emerge from empirical evidence. If border sciences disengaged from this approach, they would understand better those phenomena that appear in a certain way because they are determined by a definition that has allowed them to be circumscribed and framed within a specific *Weltanschauung*. Taking this into account can help psychology and psychiatry question a whole range of interpretations about phenomena that were thought to be the phenomena themselves.

Conceiving *addiction* only as a form of slavery protects and legitimize the public institutions to have full decision-making power over the lives of these people; however, if the right way to safeguard mental health is understood, the label “*addictus*” would not be used for the same individual.

Furthermore, questioning not only the psychophysiological effects that arise from a substance or the implementation of behavior but also what it means to do the best for the patient involved in these dynamics could generate new modes of interpretation. In this regard, it could turn out that these patients may not be slaves for their impulses but instead are searching for freedom that frees them from unsustainable constraints or from assuming responsibilities of which they do not find meaning.

In psychological terms, i.e., trying to keep the person at the center of attention, it is noticed the opportunity that those who adhere to such behaviors are not limited to be slaves to a substance, but felt disinterested in their life that nothing is more satisfying than that

refuge offered by substance use as in cases of drug *addiction*, or activity as in the cases of gambling disorder.

The question remains whether the mental health sector does the efforts needed to improve the lives of those who risk everything in the mere present because they lack both a significant past and a hope of achieving a satisfactory future project (Frisone 2021: 1, 3-4).

Addiction as a Result of Loss of Contact with Nature

The maintenance of addiction demands self-deception. Addictive ‘adaptation’ requires that primal needs be suppressed, and the alarm at their going unmet be unheard. [...] Any trouble in our life is blamed on others. Or, trouble may be owned, but only to the extent of admitting lapses in managing gratifications: “I usually have drinks only with food, a couple martinis at lunch, and a liqueur perhaps afterwards. But life has been so hectic lately I haven’t been able to eat regularly.” Self-deception encloses the addict in a substitute “world.” It can be broken through only by body-self in possession of itself, but this is what is lacking. Addictive compulsions are irrational desires for things that, once attained, do not satisfy for long. As Eric Hoffer once put it in an interview “You’ll never get enough of what you don’t really want.” Even if we succeed in stopping, the possibility of resuming typically preoccupies us. The vast consensus of observers—including sometimes the addicts themselves—is that the addictive behavior impairs one’s life. But it is difficult or impossible to stop it, for no longer possessing our ancient place in Nature’s will-of-the-place we no longer possess ourselves.

[...] The Whole is an organism composed of organs. The parts or organs exist for the sake of the Whole, feed into it, and the vitality of the Whole feeds back into the parts. Since we are organic parts of the Whole, deceiving others, or damaging them in any way, means deceiving and damaging ourselves, obviously or insidiously.

[...] Some ecologists note that the irreversible wasting of topsoil, the poisoning of air, water, and remaining soil, and the expunging of untold species of plants, animals, fish is bringing the Cenozoic age to a close. This period covers the last sixty-five million years, which saw the evolution in wilderness of the marvelous array of mammals and birds, or grasses, shrubs, and flowering plants. If these ecologists are right, as seems to be the case, we are destroying what humanity has heretofore experienced as the basis of life, growth, and regeneration itself.

[...] Our identities as body-selves may pose an intractable difficulty: to become sound individuals we must be recognized as such by our local group. But this group’s identity may be so vulnerable that it individuates itself addictively from other groups at their expense. There can be electrifying ecstatic involvement (recall waves of tens of thousands of upraised arms saluting to Hitler), but it is addictive and febrile, not regenerative for long. To show allegiance to our group tends to divide us from the source that formed us, the World-whole, and from our own organisms. [...]

There is a greatly underutilized resource for identifying with the World-whole: the Other that all cultures share—the intimate and ultimate Other—Nature. Its underutilization is no mystery. Technologically advanced urbanized countries close in upon themselves addictively. Fearfully at bottom, for they dread their fragile and porous identity be polluted by anything alien to their comprehensiveness and control. They exploit others for their natural resources (“raw materials—mere matter”) to be regulated and worked up by North Atlantic computers and machines. “Buy cheap, sell dear.”

[...] I argue that addiction is a function of vulnerability of body-self, of our inability to trust the world to respect and nourish the integrity of our “inner self.” [...] Addiction is the failure to stand trustingly open to circular power returning periodically and regeneratively into itself through ourselves—body both suffused by the environment yet able normally to contrast itself to it. [...] Rituals ...affirm us as most individuated when most in tune with the Whole. This is an obvious corollary of the general principle of value. Ritual is the deliberate intensification and clarification of ourselves. [...] Addiction can be understood as degenerate rituals that not only fail to prevent pollution or infestation but constitute forms of them (Wilshire 1999: 12, 48, 88, 71-72, 125, 127).

Addiction as Exacerbated by Colonialism

There is no biological difference between Indigenous and non-Indigenous addiction patterns; however, Western dominance has created conditions unique to Indigenous peoples that must be addressed in the healing process. Understanding diverse types of racism, acknowledging historical impact and trauma, honoring Indigenous knowledge and healing practices, and embracing cultural protection and reconciliation objectives are all part of the healing process. Indigenous peoples struggling with addiction must begin a decolonization process, questioning subjective characterizations and learned stereotypes, in addition to increasing worker knowledge. Following Yellow Bird’s call to put colonial legitimacy into question, Indigenous peoples can begin healing through neurodecolonizing exercises and supportive treatment programs.

[...] Substance misuse is new to North American Indigenous populations. Alcohol, tobacco, and caffeine have detrimental effects when consumed and ingested in harmful non-ceremonial ways as introduced through European manufacturing and use. Alcohol is regarded as the “third great substance of abuse” and that “It was extensively used for entertainment, sometimes in religious ceremonies, in all cultures of the world, except certain islands of Oceania and North American Indian tribes”. Along with forced negative assimilation practices, and the resulting trauma, when alcohol was introduced in North America, Indigenous communities fragmented due to a lack of awareness of the substance’s addictive characteristics and instruction on safe consumption techniques. Previously, tobacco was only smoked during ceremonies and in low concentrations. Tobacco was used as an offering or gift of thanks, and Inuit peoples did not use tobacco at all. Now, tobacco misuse is highest amongst Native American people. The Centers for Disease Control and Prevention argues that commercials targeting Indigenous people influenced increased non-ceremonial usage.

Substances remained harmless when used in ceremony. For example, peyote used by members of a Native American Church precluded detrimental effects when used for ceremonial reasons. [...] Inhalants, in solvents, gasoline, and aerosols are also a Western influence. Indigenous community members struggle to heal from fast-acting substances with minimal cultural tools offered through Western treatment systems.

[...] According to Quintero (2001, p. 57), colonization has shaped Native American identity as an addict, and “what we know about Native American drinking is a type of colonial knowledge.” Quintero observed a “disturbing tendency” in studies to carelessly “reinforce and perpetuate these existing colonial categories and views of Native Americans.” During exchanges, settlers used alcohol to alter the perceptions of Indigenous peoples. Addiction theories about Indigenous peoples are founded on colonial assumption that proliferates “perceived biological, racial, cultural, and social oppositions between”

settlers and Indigenous peoples (Quintero, p. 58). Statistics reinforce the colonized idea of pathology in Indigenous peoples by highlighting the stark disparity between White users and the supposed intrinsic genetic fault in Indigenous peoples. According to Reading, research studies fail to explore the underlying reasons of disparities, such as history and health determinants. Many Indigenous peoples do not misuse alcohol and do not seek therapy based on Western norms. Stewart *et al.*, submits that Indigenous persons who report heavy drinking are proportionally twice as likely as the broader Canadian population. The fact that Indigenous people abstain from alcohol at a higher rate than the Canadian average is omitted from the discussion (LaVallie and Sasakamoose 2021: 4-5, 7).

Development Induces Dependency and Addiction, Impoverishing Life

Development has had the same effect in all societies: everyone has been enmeshed in a new web of dependence on commodities that flow out of the same kind of machines, factories, clinics, television studios, think tanks. To satisfy this dependence, more of the same must be produced: standardized, engineered goods, designed for the future consumer who will be trained by the engineer's agent to need what he or she is offered.

[...] Present-day industrial society organizes life around commodities. Our market-intensive societies measure material progress by the increase in the volume and variety of commodities produced. And taking our cue from this sector, we measure social progress by the distribution of access to these commodities. Economics has been developed as propaganda for the take-over by large-scale commodity producers. Socialism has been debased to a struggle against handicapped distribution, and welfare economics has identified the public good with opulence—the humiliating opulence of the poor in United States hospitals, jails, or asylums.

By disregarding all trade-offs to which no price tag is attached, industrial society has created an urban landscape that is unfit for people unless they devour each day their own weight in metals and fuels, a world in which the constant need for protection against the unwanted results of more things and more commands has generated new depths of discrimination, impotence, and frustration. The establishment-oriented ecological movement so far has further strengthened this trend: it has concentrated attention on faulty industrial production by private owners. It has questioned the depletion of natural resources, the inconvenience of pollution, and net transfers of power. But even when price tags are attached that reflect the environmental impact, the disvalue of nuisance, or the cost of polarization, we still do not clearly see that the division of labor, the multiplication of commodities, and dependence on them have forcibly substituted standardized packages for almost everything people formerly did or made on their own.

[...] Beyond a certain threshold, the multiplication of commodities induces impotence, the incapacity to grow food, to sing, or to build. The toil and pleasure of the human condition become a faddish privilege restricted to some of the rich.

An addiction to paralyzing affluence, once it becomes ingrained in a culture, generates “modernized poverty.” This is a form of disvalue necessarily associated with the proliferation of commodities. This rising disutility of industrial mass products has escaped the attention of economists, because it is not accessible to their measurements, and of social services, because it cannot be “operationalized.” Economists have no effective means of including in their calculations the society-wide loss of a kind of satisfaction that has no market equivalent. Thus, one could today define economists as the members of a fraternity

which only accepts people who, in the pursuit of their professional work, can practice a trained social blindness toward the most fundamental trade-off in contemporary systems, both East and West: the decline in the individual-personal ability to do or make which is the price of every additional degree of commodity affluence.

[...] Where this kind of poverty reigns, life without addictive access to commodities is rendered either impossible or criminal. Making do without consumption becomes impossible, not just for the average consumer but even for the poor. All forms of welfare, from affirmative action to environmental action, are of no help. The liberty to design and craft one's own distinctive dwelling is abolished in favor of the bureaucratic provision of standardized housing, as in the United States, Cuba, or Sweden (Illich 1978: 6-11, viii).

And we need not complicate the question more than that really: modern “civilization,” by one means or another, fabricates and develops insatiable and destructive addictions. I don't actually think we need much theory regarding addiction and ecology. We need more action. But it seems that we may need at least a bare minimum of theory because clearly the field has received near zero attention (and even the above quotes do not develop the “ecology” side of the equation). In the US alone more than 100,000 people die each year due to drug overdoses (Interlandi 2022). “Overdoses are now, in fact, the number one cause of accidental death, surpassing even auto fatalities. [...] At the same time, Big Pharma, Big Food, Big Tobacco, Big Alcohol, and Big Business in general all seem to intimately understand addiction and how to manipulate it” (Szalavitz 2016: 2). Biodiversity loss and climate change alone present existential threats to our life on Earth (Greenfield and Weston 2021; Watts 2018). Given these tremendous social and ecological crises at hand, why has this topic not developed into its own activist-oriented field of study? (I can only guess that perhaps most academics do not want to question their own addictions or complicity in ecological destruction? I don't know). No one else has offered up much (that I know of) but we could probably use some basic guidelines in this respect if, for nothing else, to only help guide readers as to the common thread that served to select and filter material for inclusion in this anthology.

Toward that end, I propose a conception of *addiction-profit-harm entanglement* (APHE). This basic formula expresses a fundamental dynamic between industry and ecology in relation to addiction:

(1) The more *harm* that industry can inflict upon people and the environment, the more opportunities business will have to provide additional products or services to address those harms or the *byproducts* of those harms. This applies to everything from pollution that increases chronic ailments requiring industrial “remedies” to an oil spill that devastates a habitat requiring a massive “clean-up,” from fossil fuel contributions to climate change that spawn entire new “alternative fuel” industries to fracking that increases earthquake frequency. At the apex of this phenomenon we see conventional warfare which creates maximal harm in concentrated periods in time thereby paving the way for post-war reconstruction and new weapons production and sales.

(2) Addictive profit-harm enterprises provide an especially irresistible opportunity in that addiction enables the first dynamic above to take place on the basis of a daily or weekly *subscription*. Addiction churns the profit-harm cycle with steady returns. Personal and collective behaviors can then underwrite the economic profits of industry in massive ways over long periods of time and in a number of innovative ways. From industry's perspective, addiction provides a key element to the profit-harm dynamic and together

they suggest that, unaddressed, we should find ourselves exactly where we remain today: perpetually stuck in ever new promises, new technologies, and new hopes that industry will solve the last mess that it created when, in fact, the “solution” fulfills the ongoing cycle. Electric cars replace fossil fuel-driven cars as electric cigarettes replace tobacco. Yet none of them replace or remotely raise awareness about—much less address—the addiction-profit-harm entanglement that swirls at the core of industry’s mass destruction of animals, habitats, and decent living conditions for all forms of life on Earth.

At the same time, APHE phenomena may seem devilishly elusive. Nearly always, one only sees the economic benefit of *harms* produced by an addictive industry when clumping various competing industries into a single conflated unit. For example, cigarette companies merely profit from the sale of their own product. They do not benefit when pharmaceutical or medical industries treat the chronically ill. Nor do they profit directly from the destruction of aquatic life forms when cigarette butts damage them or massive cigarette pollution inspires “clean-up” campaigns. Subsequently, it seems virtually impossible to actually study or even see, in any academic sense, the dynamic of APHE.

Yet, one might postulate a sort of systemic organism-oriented approach akin to James Lovelock’s Gaia theory but in reverse: decentralized property/profit-steered economics produces its own sort of parasitic ecology in which distinct and discrete components work together, even while in ostensible competition, to maintain a maximum growth trajectory. Instead of Gaia, we succumb to an anti-God, a Makhanaios (Greek: *makhana* = machine; *ios* = poison), a sort of “poison machine” that operates to spread itself, destroy, and contaminate the very organism upon which it parasitically exists.

In other words, each unit within this economic machine-ecology seeks to maximize its own profit and looks at the world from its own narrow confines yet, collectively, these units behave opportunistically to destroy those parts of their environment that do not seem to have intrinsic value in order to extract components that *can* produce value. A tree or even a forest has no economic value if it just sits there so, metaphorically speaking, all of the various competing economic units agree that they prefer to see the tree or forest cut down and destroyed in order for each of the various companies to compete over any potential product or byproduct. Any boundaries that protect non-economic zones from economic exploitation *ipso facto* infringe on the collective right of economic units to find ever-new terrain to exploit. Now that they have made significant headway in exploiting all possible land, economic units seek out new terrain: the sea, the air, the psyche, and new ways of exploiting human bodies (creating ever new neuroses and psychic complexes for industry to “fix” of which the recent and ongoing cooptation, medicalization, and exploitation of transgender we now witness).

It may seem difficult to visualize this type of concerted effort so I offer an analogy in the form of a cookie jar “gang.” Imagine a group of rambunctious children who see a cookie jar. If they know that they can get the cookies by toppling the cookie jar from the shelf then they do it. And so they do. Initially, the destruction of the jar itself may seem like unintended collateral damage. However, if the gang of kids realize that (a) adults keep repairing the jar then they take advantage of this dynamic; and (b) other children will pay for the highly addictive cookies, the gang mentality can formalize. Subsequently, the kids keep smashing the cookie jar, now intentionally, in order to sell both the cookies to others and to sell their services of repairing the cookie jar to the adults. The gang of kids may often engage in internal competition over who gets the fallen cookies or who receives the contract for repairing the cookie jar each time but they all agree that the pattern of smashing the cookie jar and selling the cookies works in all of

their favor. As long as they get paid and as long as the cookie jar gets refilled, nothing else matters to gang. Their plans and calculations revolve around maintaining the current state of affairs. They may seek to expand their business operations to other areas but they do not concern themselves with any questions except those through which asking might eventually produce additional profits (concern for societal welfare, human or animal health, and ecological sustainability do not qualify). In this way, the cookie jar gang expresses some of the core dynamics of industry in the sense that various corporate competitors can vie with one another over the particulars (e.g., who gets which contract) while agreeing on the generals (e.g., deregulation, continued exploitation of new terrain, etc.). No one in the gang necessarily even wants the jar to break but the gang's current racket demands it. In some sense then, the gang engages in a constant form of warfare against everyone else in order to feed their addiction to profit. And profit-based economics not only encourages but imposes that rule for any company who hopes to survive.

Bringing that metaphor back home to our current situation, we *live* in that cookie jar and industrial gangs put jackhammers to it night and day across the world to tear parts of it apart for what they can sell with no consideration for the consequences (except perhaps the bad publicity they might get which, hypothetically, could reduce sales somewhere down the line; individual corporation heads who strive to live with “a conscience” go against the grain and typically succumb to greenwashing and self-deception to coordinate both profit-making *and* sustainability). Addiction fuels workers operating the jackhammers, it fuels trucks transporting the fragments, and it fuels each of the recipients along the way who pay for their sales report, their screentime, their fix, their sugar, their animal flesh, their buzz, their momentary “high.” It seems incomprehensible to really calculate the processes that drive global ecological devastation *without* factoring in addiction.

Yet none of this means that we blame *persons* who struggle with addiction. To the contrary, each person shares this struggle with millions and millions of others similarly trapped in the confines of a gigantic system. This theory (APHE) helps clarify that we have *structural* issues of addiction that operate systemically regardless of whatever choices any given person makes. No person need carry that burden of the entire system on their back. But each reader who wants to liberate themselves from that system may want to investigate how much addiction—and which ones—they may want to relieve themselves of as they proceed to challenge a system that perpetually tries to dope them (all of us) into submission.

Structure of this anthology

This anthology presents material from a wide range of disciplines from history to sociology, from biology to ecology, from health research to activist-oriented polemics. Readers can discern themselves which articles or chapters feel relevant to them and in which ways. This anthology simply aims to put the material out there in one spot because no one else has done it.

A knee-jerk “academic” reaction might dismiss this entire anthology as “chaotic,” “too broad,” or “all over the place.” Well, *yeah*. That reflects how the intersection between addiction and ecology seems *chaotic, too broad, and all over the place*. Pretty much everywhere and in very different, complex ways. Which seems like the best way to present it too without (as academia often does) completely ignoring or leaving out 90% of

the picture to make it more “manageable” and “subject to study.” That said, we do have some structure here, as follows:

First, this **Introduction** should serve as both a basic intro to the theme of the book and also useful on its own, independent of the anthology. It should set the tone of the book, academic in some sense but also resistant to dominant academia. It should present the basic concepts in plain English (something that many English-speaking academics clearly have a hard time doing, see Belina 2005). It gives a view of the type of conceptions of addiction, ecological concerns, and theoretical premises that shape this volume. And, finally, this intro also lays out the structure of the anthology (where, in some cases, I insert smaller quotes that seemed too short include as separate chapters).

Second, **Chapter 2, “History of Addiction: Colonialism, Enslavement, and Economics”** lays out a general backdrop to the tandem development of colonialism, mass-scale addiction, racism, and intoxication culture. Marc-Antoine Crocq provides a general historical view while Marie-Anik Gagné addresses aspects of colonialism and addiction in relation to James Bay Cree and other First Nations peoples. From an activist perspective, Lorenzo Kom’boa Ervin discusses “white” supremacy, racism, and how this has led to a drug epidemic and a type of “Black genocide.” Even in the basic realm of colonialism and the mass-production of addiction, we lack research. Colonialist institutions (such as academia) create their own blind spots in terms of how elites and dominant institutions apportion priority and relegate certain realms to the margins.

Writing African drug history is a challenge, given the paucity of evidence for the production, consumption, and trade in most drugs. Even for the twentieth century, where there is considerable more evidence to work from, there is little scholarship beyond the considerable literature on alcohol. [...] Beginning in the sixteenth century, Africa moved gradually and unevenly into a global drug economy that was linked tragically to slaving and the slave trade in both the Atlantic and Indian oceans. Well before this period, merchants and seamen carried cannabis from South Asia to the Swahili trade towns on the eastern African coast. From there, Arab and Swahili commercial caravans carried the drug into the interior. Cannabis was itself not a significant trade commodity but, but the thousands of laborers who transported goods along the merchant routes often used the drug. Once the drug progressed through commercial networks across the continent, it was carried across the Atlantic to the Americas. In return European merchants carried tobacco, an indigenous crop, and rum, a product of the plantation slave economy, east to Africa. We know little about the process through which the American drug crop, tobacco, became part of the African agricultural economies, or for that matter about the development in the twentieth century of industrial cigarette manufacturing and the sophisticated market systems that accomplished it (and which have intensified in recent decades as the industrialized world has lost its affection for tobacco). Rum was an essential commodity in Atlantic trade and rapidly became established in the consumer and consumption cultures of coastal West African societies (Ambler 2022: 192, 194-195).

Subsequently, in many instances, we must rely on first-hand accounts. See, for example,

Addiction and Recovery through an Africentric Lens:

Slave Masters carefully controlled the slaves' access to alcohol. Slaves were prohibited from drinking under normal circumstances but encouraged to drink heavily on Saturday nights and holidays. Douglass viewed such controlled promotion of drunkenness (via such rituals as drinking contests) as a way to keep the slave in "a state of perpetual stupidity" and "disgust the slave with his freedom" (February 18, 1846 Glasgow Speech).

These holidays serve as conductors, or safety valves, to carry off the rebellious spirit of enslaved humanity ...this mode of treatment [promoting episodic drunkenness] is a part of the whole system of fraud and inhumanity of slavery. (Douglass, 1855, p. 256)

Douglass further noted how the slave master's promotion of drunkenness reduced the risk of slave rebellions.

When a slave was drunk, the slave holder had no fear that he would plan an insurrection; no fear that he would escape to the north. It was the sober, thinking slave who was dangerous, and needed the vigilance of his master to keep him a slave (Douglass, 1855, p. 256).

Douglass challenged African Americans (slave and free) to abstain from drinking as an act of personal emancipation and as a preparatory step for full citizenship. Through his encouragement and example, nineteenth century African Americans generated their own temperance and mutual aid societies that framed a commitment to sobriety as a stairway to freedom. The pledge recommended in the Temperance Tract for Freedman read:

Being mercifully redeemed from human slavery, we do pledge ourselves never to be brought into slavery of the bottle, therefore we will not drink the drunkard's drink: whiskey, gin, beer, nor rum, nor anything that makes drunk come (Cheagle, 1969, p. 29).

A century later, Malcolm X portrayed alcoholism and addiction as part of the continued machinery of African American oppression. He noted how intoxication had become part of the very fabric of Harlem and other Black communities.

...almost everyone in Harlem needed some kind of hustle to survive, and needed to stay high in some way to forget what they had to do to survive (Autobiography, p. 91).

Like Douglass before him, Malcolm X understood that white institutional interests were well served by addiction in the Black community:

...black junkies are trying to narcotize themselves against being a black man in the white man's America, but...the black man taking dope is only helping the white man to "prove" that the black man is nothing (Autobiography, p. 260).

The white man wants black men to stay immoral, unclean, and ignorant. As long as we stay in these conditions we will keep on begging him and he will control us (Autobiography, p. 221).

While Malcolm X viewed addiction as an outgrowth of historical oppression, he angrily denounced African Americans who embraced their victimhood as an excuse for continued self-destruction. For him, the source of African American salvation could be found only in resources inside their own souls and inside their own community.

The social philosophy of black nationalism only means that we have to get together and remove...alcoholism, drug addiction, and other evils that are destroying the moral fiber of our community. (From 'The Ballot or the Bullet' speech, April 4, 1964, Cleveland, Ohio; Malcolm X, 1965)

Malcolm X thought the worst crime America had committed was teaching African Americans to hate themselves, and he saw alcoholism and drug addiction as a direct manifestation of that self-hatred. He saw recovery as a side effect of the spiritual transformation and the psychological, economic and political liberation of Black people. He practiced and challenged others to live a clean life—no alcohol, drugs, tobacco, gambling, or extra-marital sex—as a daily act of respect for self, family and community. Like Douglass, Malcolm X saw booze and dope as anesthetics that numbed the pain of cultural oppression and dissipated the potential for political protest and economic self-determination. For him, sobriety was more than an act of personal reformation; it was a political act of resistance—a refusal to embrace racial suicide, an act of personal/cultural survival and healing. Like recovery leaders before and after, Malcolm X challenged those who had been saved from addiction to return to the “junkie jungle” to salvage those who were still suffering (Autobiography, pp. 261-262) (White, Sanders, and Sanders 2006: 54-56).

The scope of colonialism and drug trades spans the globe across centuries. Take one small example of British opium trade in colonized Burma:

From the earliest days of British administration in Tenasserim, different ethnic groups within Burma were treated differently with regards to opium use. There is evidence that the colonial administration's view of opium use among a particular group was influenced by the degree to which use of the drug was perceived to facilitate social stability and productivity, or unemployment and social breakdown.

[...] European merchants began to participate in the Southeast Asian trade in opium in the 17th century. By the 1650s, the Dutch East India Company was buying up opium produced in Bihar and west Bengal at Patna from Indian merchants, and transporting it to Southeast Asia. In 1708, the British East India Company started participating in the trade. In 1763, the British East India Company captured Patna in Bihar, gaining control over most of the opium produced in the region, and did its best to exclude all other nationalities from dealing in opium. [...] In 1797, after the contract system proved subject to abuse—cultivators were being forced to sell their opium at less than production price, and opium was frequently adulterated—an agency system was instituted." The opium production that the East India Company controlled, and that was regulated by the agency system, was grown in the northwest region of India, and was one of two types—*Patna* opium, which was grown in Bihar, and *Benares* opium, which was grown in the northwest provinces. However, the opium poppy was also cultivated in west and central India.

[...] Thomas Metcalf describes imperial ideology as “shot through with contradiction and inconsistency.” Official views of opium in British Burma seem to fit this description: opium use was a cause for concern among the Burmese population, yet was widely considered to be harmless among the Chinese community in Burma. Ultimately, these contradictions and inconsistencies were used to achieve effective imperial rule. Opium legislation that treated the ethnic groups within Burma differently from one another did so with the aim of achieving the various elements that were deemed necessary for stable and profitable colonial rule: revenue, a productive work-force, and a co-operative and socially stable population. This legislation followed the 1886 conquest of the independent kingdom of Burma, and would be upheld by the Royal Commission on Opium (Wright 2008: 611, 614, 639).

Third, **Chapter 3, Fog of War: Coca, Opiates, and Antidepressants** discusses some of the background wars ranging from the war in jungles and across borders for control over specific land and peoples to psychic wars of legally doping people and committing them to chemical contracts of prescriptions to toxins that pollute our environment while polluting people’s blood streams and neural networks. We begin this section with critiques of antidepressants. In particular, Dr. Peter Gøtzsche has pioneered in exposing the deception of Big Pharma trying to sell antidepressants to quell people’s natural responses to an oppressive society: Antidepressants may cause more harm than good. But who listens? Despite legally killing people in “large numbers” pharmaceutical companies not only get away with murder, they manage to convince millions of people that antidepressants work better than non-chemical routes. Joanna Moncrieff has also made headlines with research exposing the serotonin myth of “chemical imbalance.” Although drug companies and mainstream media try to spin the resounding research, scholars such as Bruce Levine have, in turn, exposed that spin. Related to this topic, other scholars have documented various ways that antidepressants harm animals and natural habitats. Finally, Witness for Peace, William Allen, Chad L. Smith and others discuss ways that war, ecology, drugs, and illegal drug production (such as cocaine) intersect.

Fourth, **Chapter 4, Routine Violence: Cigarettes, Alcohol, and Coffee** turns to the more obvious and banal expressions of intoxication culture in everyday life. Three drugs, alcohol, coffee, and cigarettes, all creating a sense of dependency and all tied intimately to colonialism and enslavement. Elli Slaughter *et al.* discuss the impact of tobacco and cigarettes on animals and eco-systems. Marianna Havryshko *et al.*, and provide one of the few available reports on alcohol’s relationship to ecology while

Andrew Bartlett *et al.* document how the alcohol industry may affect research. Finally, Kelly Austin examines coffee's unequal trade and environmental implications. As an introduction to the topic of alcohol and ecology, we can cite James Wilt, author of *Drinking Up the Revolution: How to Smash Big Alcohol and Reclaim Working-Class Joy*, who wrote:

Alcohol has an extremely long and complex history, but its ever-increasing ubiquity is largely the product of its commodification and deregulation by Big Alcohol.

The industry and its army of trade associations and front groups incessantly jostle to increase consumption, market share and profits, manipulating and influencing pricing and taxation, licensing and density of retail, advertising and sponsorships, international trade agreements, obfuscating scientific findings, and delaying public health efforts. Rather than being subjected to intense tobacco-style restrictions, the alcohol industry has so far successfully fought to maintain “self-regulation” and offload responsibility for alcohol-related harms on to individual “problem” users, especially through the discourse of “responsible drinking”.

But alcohol-related harms are not restricted to those experiencing dependency (about 600,000 people in England alone). Even relatively low doses of alcohol consumed on a regular basis increase the risk of health issues, including digestive and cardiovascular diseases, traumatic injuries and cancers of the esophagus, liver and breast; a recent study estimated that almost 750,000 new cancer cases in 2020 were attributable to alcohol use worldwide, including about 100,000 from “moderate drinking”. Previously heralded claims of alcohol, especially red wine, providing a “protective” function for issues such as heart disease and diabetes are also in doubt and now considered “offset by monotonic [closely correlated] associations with cancer”. The crisis of alcohol-related harms is principally caused by the fact that the profit-motivated alcohol industry structurally incentivises higher-risk drinking. Industry revenues would drop by 38%, or £13bn a year, if all drinkers used alcohol below recommended guidelines, according to one study. Companies have a clear vested interest in preventing such reductions, yet it's exactly this kind of structural change—rather than voluntary and ineffective measures preferred by industry—required to seriously curb alcohol harms (Wilt 2022).

Similarly, in relation to cigarettes and tobacco, we can hear from World Health Organization's reports:

In 2011, around 4,200,000 hectares of land were devoted to tobacco growing, representing less than 1% of total arable land globally; however, in several low-and middle-income countries, the percentage of arable land devoted to tobacco growing has recently increased.¹ For example, it has almost doubled in China, Malawi and the United Republic of Tanzania since the 1960s. Deforestation for tobacco growing has many serious environmental consequences—including loss of biodiversity, soil erosion and degradation, water pollution and increases in atmospheric carbon dioxide.

[...] Most cigarettes are lit using matches or gas-filled lighters. If, for example, one wooden match is used to light two cigarettes, the six trillion cigarettes smoked globally each year would require the destruction of about nine million trees to produce three trillion

matches. There are also environmental impacts of manufacturing and disposing of the plastic, metal and butane used in making cigarette lighters.

[...] In the United Kingdom of Great Britain and Northern Ireland, cigarettes caused 7% of fires in 2013–2014, making them the single most important cause of deaths related to fires (34 deaths/1000 fires). In the United States of America, cigarettes have been responsible for 8–10% of all fires over the past 10 years (on average 90 000 fires per year); they also remain the single most important cause of deaths related to fires (540 of 2855 total deaths in 2011) (Novotny, Thomas E. *et al.* 2015).

As the WHO Framework Convention on Tobacco Control (FCTC) put it: “There is a fundamental and irreconcilable conflict between the tobacco industry’s interests and public health policy interests” (WHO 2015). I don’t know how one can emphasize the toxicity of tobacco culture enough:

No matter the beach or its location, there’s little escape from the blight that plagues many of them: cigarette butts.

Spain’s nearly 5,000 miles of coastline are no exception. “On beaches where smoking is allowed, unfortunately cigarette butts continue to rank as the most found waste product and the one with the most significant impact,” says Inés Sabanés a Spanish lawmaker with the Más País-Equo governing coalition.

The coalition was the driving force behind a new legal framework that came to effect in April, which allows local councils to ban smoking on their beaches and impose fines of up to €2,000 (£1,700).

Some sources of plastic pollution are less obvious, such as cigarette butts and sachets. Then there’s the vast, unseen churn of microplastics—trillions of tiny fibres and beads that are now so much part of our water systems that every week most people drink a credit card’s worth of it.

Microplastic itself has many sources. It comes from clothes fibres, released in washing machines, and from nurdles, the building blocks for many plastic goods that are often spilled in their billions from ships, causing as much damage as oil spills (though still not classified as hazardous).

And it comes, in huge quantities (representing about a quarter of all microplastic in oceans), from tyre dust—the residue generated as people

drive their cars (and even bicycles) down the street. [...]

The move has catapulted Spain to the forefront of countries seeking to crack down on what the UN describes as “the most discarded waste item worldwide”: the estimated 4.5tn cigarette butts littered each year.

Whether flicked on to beaches, tossed in parks or dropped on to streets, many of the tiny, lightweight butts end up in bodies of water, swept there by rainfall and storm water systems.

Few are aware of their persistent and potentially harmful effects on marine environments, says Kari Martin of New Jersey-based Clean Ocean Action.

“It is part of the plastic problem,” said Martin. “Many people don’t know that cigarette filters themselves are made out of plastic fibres.”

These plastic filters—estimated to be a component in more than 90% of commercial cigarettes—are made of cellulose acetate. “Plastics don’t break down over time, they photodegrade, which means that the light breaks them into smaller pieces but they don’t eventually go away,” says Martin.

These bits of plastic and microplastic are carried along coastlines and waterways, there is little to prevent them from becoming food for animals. The cigarette butts themselves look like little fish,” said Martin, citing a photo snapped on a Florida beach in 2019 that showed a Black Skimmer gingerly feeding a cigarette butt to its chick (Kassam 2022).

Fifth, Chapter 5, Socializing Vampires: Meat, Sugar, and Animal Exploitation addresses the ways in which our natural need for food gets transformed by industry into addictions and even unnecessary and callous exploitation of animals for the sake of human pleasure, entertainment, and corporate-driven compulsions. Carolin Laier’s master’s thesis describes “The Power of Environmental Vegetarianism.” Carlo Colantuoni *et al.* research sugar and dependency and elsewhere, A. M. Davis *et al.* discuss ecological impacts of sugar production. The section concludes with activist perspectives on drugs and animal experimentation as well as myths about veganism (e.g., PETA, Screaming Wolf, Sarambi). Drugs have a secret and hidden but horrendous effect on the lives of many animals simply by humans exploiting animals to test drugs and alcohol upon them.³⁰ This takes place even though even as early as the 1990s, doctors and scientists felt skeptical as to its usefulness “Increasing numbers of scientists and clinicians are challenging animal experimentation on scientific grounds” (Cohen1998: 1).

Sixth, Chapter 6, Electrifying Addiction: Consumption, Cell Phones, and Computers signals various ways in which previous addictions have gotten a particular boost through heightened dependency on consumption of market products and new addictions have developed, taking us into a new era of electronic addiction unfathomable to our great grandparents, their generation, and all generations before them. Robert Todd

³⁰ “Contrary to clinicians who seek to treat people with a diagnosis of addiction to become and remain abstinent, preclinical researchers who use nonhuman animals (designated as animals thereafter) work in the opposite direction. They start with nonaddicted animals, generally initially drug-naïve, and try to make them addicted to a drug that has known addictive properties in humans. The immediate goals of this research are to gain insight into the etiology and neurobiology of drug addiction and, ultimately and hopefully, to translate this knowledge into effective treatments for people with addiction. [...] Thus, to be considered having an addiction-like behavior, animals must, in addition to self-administering cocaine, develop or present an array of behavioral changes that recapitulate important behavioral features of cocaine addiction (e.g., escalation of cocaine intake, continued drug use despite punishment). Ideally, however, one should search for direct evidence that rats have lost control over cocaine self-administration, and that that they take cocaine by compulsion (i.e. in response to an uncontrollable impulse to take cocaine) (Ahmed, 2010) and not because of other nonpathological causes.” S. H. Ahmed, “The science of making drug-addicted animals,” *Neuroscience* 211 (2012): 108-109; Such exploitative experiments do not just take place on rats (not that that would justify them) but also on apes (and animals in-between on the evolutionary scale), see: Drake Morgan, *et al.* “Social dominance in monkeys: dopamine D2 receptors and cocaine self-administration.” *Social Neuroscience Psychology Press* (2013): 243-252; Also, even when not testing animals for addiction, they may test the harms of addiction passively (such as second-hand smoke) by essentially torturing them: Yasumitsu Ajiro, *et al.* “Impact of passive smoking on the bones of rats,” *Orthopedics* 33, no. 2 (2010): 90-95.

Perdue and Gregory Pavela examine coal and addictive economies, while Shaun Smyth *et al.*, Sarah Griffiths, Mike Cummings, and various writers from *Green Anarchy* discuss Internet, technology, ecology, and addiction. In particular, Chauncey Neyman provides a useful overview of the various addictive mechanisms that IT corporations intentionally use to increase addictive behavior (things like infinite scrolling, gamification, and illusion of choice). Yes, we live immersed in a society that constantly encourages us to submit to addictive compulsions for the sake of profit.

This section alone could probably fill several volumes because, once we start looking at society's addiction to consumption, we see it everywhere. We never live many moments far from the smell of gasoline, the constant hum of electricity, the touch of plastic, or the *ka-ching* of purchases, much of it unnecessary and some of it downright insane. Social prejudices like preferences for tall people could lead to social solutions that address the prejudice but instead they more commonly result in women wearing high heels or, in extreme cases, hundreds of people (mostly males) get limb-lengthening surgeries each year (which can cost between \$75,000 and \$280,000).³¹ How about online gambling (400,000 addicts in the UK alone)?³² Or take fireworks, a multi-billion dollar industry, especially in places such as India, China, the U.S., and Europe which cause immediate surges in toxic air pollution (not to mention the annual pollution caused by travel and barbecuing dead animals to celebrate "independence" every Fourth of July). Even 15 years ago, fireworks annually produced about the same amount of carbon emissions equivalent to 12,000 cars in addition to releasing contaminants into the air and waterways that harm birds, mammals, and aquatic life, and causing unnecessary injuries to pets, wildlife, people, and plants: "In 2016, fireworks produced 5,000 tons of particulate matter (PM10—particles measuring less than 10 microns in diameter) in Germany alone, according to the Federal Environment Agency (UBA). This amount corresponds to about 17 percent of the annual vehicle particulate emissions."³³ How about the orgiastic consumer-ritual of Christmas which purportedly celebrates the birth of Jesus with the wanton murder of trees: each year people in the U.S. and Europe cut down approximately 80 million trees (mostly harvested from monocultural farms)?³⁴ That type of massive annual Xmas (eXtraMess) destruction does not even begin to include the addictive destruction of travel, presents, wrapping paper, plastic products, packaging,

³¹ See Tom Brada, "Leg-lengthening: The people having surgery to be a bit taller," *BBC* 5 December 2020, <https://www.bbc.com/news/world-55146906> and Elamin Abdelmahmoud, "He Was 5'7". After Surgery, He'll Be 5'10". *Buzzfeed News*. 29 April 2022.

<https://www.buzzfeednews.com/article/elaminabdelmahmoud/limb-lengthening-surgery-height-stigma-short-kings>

³² See Deniz Cemiloglu, *et al.*, "Towards ethical requirements for addictive technology: The case of online gambling," 2020 1st Workshop on Ethics in Requirements Engineering Research and Practice (REthics). IEEE, 2020. <https://ieeexplore.ieee.org/document/9226394>

³³ Some sources on fireworks: Hannah Fuchs, "How harmful are fireworks?" *Deutsche Welle*. 29 December 2017. <https://www.dw.com/en/new-years-eve-fireworks-harming-the-environment/a-41957523> Li Liu D. *et al.* "The Effect of Banning Fireworks on Air Quality in a Heavily Polluted City in Northern China During Chinese Spring Festival," *Frontiers in Environmental Science* 10 (2022); Georgette Kilgore, "Carbon Footprint of Fireworks (How Much CO2 Do Fireworks Produce?)," *8 Billion Trees*, 30 December 2022. <https://8billiontrees.com/carbon-offsets-credits/carbon-footprint-of-fireworks/>

³⁴ Some sources on Xmas trees: Georgette Kilgore, "How Many Christmas Trees Are Cut Down Each Year? (New Stats)," *8 Billion Trees*, 21 September 2022. <https://8billiontrees.com/trees/how-many-christmas-trees-are-cut-down-each-year> ; Christine Farr, "The impact of Christmas trees on the environment," *Agronomag*, 20 December 2017. <https://agronomag.com/impact-christmas-trees-environment/>

food waste, garbage disposal and pick-up, lighting, and additional energy usage that the ritual entails. If anything, quite far from the simplicity of birth in a manger and a life of hobo communism associated with Jesus, the seemingly irresistible combination of stress, consumption, and pollution of Christmas “celebration” neatly embodies the logic of habitual toxic consumption that defines modern economics.

Irrespective of the economic debate surrounding employment and inflationary issues, the general flavour of all mainstream macroeconomic policy is essentially the same—it is unashamedly pro-growth. Given the link between growth and natural capital depletion, there is little doubt that contemporary macroeconomic policy contributes significantly to the growing pressure being exerted on the ecosphere and the subsequent loss of biodiversity. [...] Biodiversity conservation is threatened by many things but none more so than humankind’s addiction to growth (Lawn 2011: 342, 351).

The “religion” of economic growth, based on hierarchical coercion and for-profit superstitions, permeates and plagues all aspects of “civilization”. Many people either never knew or quickly forget how economists calculate economic growth: 20 people riding bikes and staying healthy does almost nothing for GDP (Gross Domestic Product). That equates to “bad for GDP”. But put those same 20 people in cars that consume gas, pollute the air, and end up in a massive 20 car accident involving lawyers, doctors, mechanics, therapists, journalists, and insurance companies and then GDP rises tremendously. Disasters, planned obsolescence, poor health, accidents, and pollution work great for GDP. But which group of 20 people would you prefer to belong to? Sorry. As a society, you have no choice. The very economic system we remain trapped within runs according to the destructive dictatorship of GDP. In other words, society as it looks today *cannot* opt for genuinely sustainable production and consumption. Essentially useless or harmful activities (such as gambling or alcohol consumption) will always raise GDP while GDP as a means of measurement will underestimate or ignore the value of essentially healthy and sustainable activities (such as listening to a friend or walking).

Seventh, **Chapter 7, An Ecology of Healing: Sobriety, Addiction, Sanctity, and Resistance** addresses some of the ways that people have responded and thought about responding to addiction issues. Sobriety takes many forms as people attempt to maintain integrity, commitment, and independence from corporate and low-level dealers of intoxicants from all angles. From indigenous storytelling (Margaret Smith) to the work of William James and Alcoholic Anonymous (J. D. McPeake), this section offers different ways of looking (or not looking) at addiction and how people have dealt with it even theoretically, as in applying personalized therapy successes to macro-structural issues (e.g., Costanza, *et al.*). The story of struggle and success at the Alkali Lake Community gives a close-up view of what change can look like, especially in a Native American context.

Nonviolent Communication, healthy vegan/vegetarian diets, and organizing social resistance to intoxication culture can all express means of potential change. In particular, this section highlights straight edge which has received little attention in either ecology or addiction research. For some relatively individualized approaches, one might see a solution in personal perspectives or new experiences. “Awe undermines addictions,” as one scholar put it (Wilshire 1999: 258). True perhaps, but if ultimately addictions stem from disrupting connections to community and nature then redeveloping those

relationships—beyond emotions or experience and toward structural changes may seem in order. One structural approach builds on the concept of “Community Readiness Strategies” which can have three broad steps or stages: 1. *Raising Awareness* (e.g., One-on-one visits with community leaders and members; visiting groups; organizing a local group of friends and allies willing to work on it; put out flyers, posters, and brochures; submit letters and articles to local media; organize events potlucks and workshops); 2. *Planning and Coordinating* (e.g., connect community organizers around the issue; see what programs exist, what has resulted, and what needs improvement; examine school curriculum on the issue and develop paths to improve; do local research and publicize results, conduct public forums and engage in town hall/city council meetings on the matter); 3. *Institution-building* (figure out funding such as grants or money-pooling to finance program development; organize training for local businesses and schools; conduct quarterly meetings for evaluation, review, and modification; develop a local speaker’s bureau; diversify funding; network with regional, national, and international groups; embed feedback loop of for re-assessment and development; circulate roles and publish reports on accomplishments and goals) (Edwards *et al.* 2000: 302-305). In general, we could divide approaches to addiction into four different categories:

As I studied the many attempted responses to the problem of addiction, I came to distinguish between four broad approaches that have recurred throughout history. A *prohibitionist* approach has sought to control addiction through punishment and other law enforcement strategies. A *therapeutic* approach has argued that addiction is best handled as disorder to be treated by the medical field. A *reductionist* approach has sought to explain addiction in scientific terms, often seeking biology-based cures. And a *mutual-help* approach has sought community healing and grassroots fellowship—and sometimes, but not always, spiritual development—to recover from addiction. Variations on each of these abound, and they also overlap and blend into one another at times, but overall, they occur with surprising regularity across the centuries. What should not be surprising is that no single approach holds all the answers. Each of these approaches has had its turn in responding to addiction—often multiple turns. Whether a “miracle drug”, a new enforcement policy, or an innovative rehabilitation program, these interventions almost always took the form of a quick fix that would ostensibly solve the problem of addiction—or sweep it under the rug, or dominate and control it. None has ever been successful for long (Fisher 2022: xv-xvi).

In this way, it advisable to, when possible, apply a “diversity of tactics” when grappling with addiction. What works with one person or one community at one point in time might not work with another but if a given community or region can sustain a variety of approaches simultaneously, then that at least gives members of that community a maximum of opportunities to address it however they feel fit. We can read in the Ph.D dissertation by Heru Setepenra Heq-m-Ta about Africana health traditions in Philadelphia inspired largely by Elijah Muhammad and partly by MOVE:

Since the publications of *How to Eat to Live* [by Elijah Muhammad] in 1967 and 1972, respectively, Black advocates of vegetarian and vegan cuisine have provided healthier food options for aficionados of the dietary practices particularly associated with slavery. [...] The African Hebrew Israelites are a predominately African American religious

organization in which the members' dietary regime consists of either vegan and/or raw foods. Popular in Black communities across the globe, their main culinary enterprise, named *Soul Vegetarian*, is the largest chain of Black-owned vegan restaurants worldwide, with locations in Atlanta (the first of its kind), Chicago, Israel, Maryland, Tallahassee, and Accra and Cape Coast, Ghana. [...] Given all of Alvenia Fulton's accolades and contributory efforts in the tradition of alternative medicine, one can easily contend that her most visible and enduring accomplishment as a Jegna in the holistic health and natural foods movement was her assistance of Dick Gregory on the path of health and wellness. [...] During an era when a lion's share of African American cookbooks were devoted to celebrating soul food, Dick Gregory became arguably the most conspicuous promoter of vegetarianism, and a raw foods and fruitarian diet (Heq-m-Ta 2016: 158-159; 192-193).

According to Warren Belasco, the public began to take notice in what he deems the "counterculture cuisine" as early as 1966 in the Haight-Ashbury district of San Francisco, California. However, argues Belasco, a larger following of this counterculture of cuisine developed after the takeover of People's Park in Berkeley by residents in April 1969, in which local residents "planted vegetable seeds, trees, and sod...[and] shared fruit." In consequence, the establishment of food cooperatives (i.e., co-ops) across America was a direct result of the conflict at People's Park. It is imperative to highlight that this progressive food movement that Belasco mentions was spear-headed and run largely by a white liberal populace, and in no way should it overshadow Blacks' activist stance toward health and wellness during the same timeframe. In fact, there were organizations run by Africans in America that also advocated a naturals foods dietary lifestyle. Conceivably, the most notable group, given some disastrous events, was Philadelphia's MOVE organization, which espoused a strict vegetarian and mostly raw foods eating regimen by the early 1970s. According to authors John Anderson and Hilary Hevenor, the inspiration behind the philosophical outlook on dietary practices was inspired first in 1965 when MOVE founder John Africa's wife, Dorothy joined "the Kingdom of Yahweh, a religious sect whose members were required to maintain a vegetarian diet;" a regimen John Africa would subsequently accept as his own and adopt as a way of life for MOVE (Heq-m-Ta 2016: 134-135).³⁵

³⁵ The work here sourced the following: John Anderson and Hilary Hevenor, *Burning Down The House: MOVE and the Tragedy of Philadelphia*, New York: WW Norton & Company (1987): 2; And the author went on to quote from MOVE's "Beliefs and Practices": "'The diet of JOHN AFRICA gave us consists of fresh raw food. We always keep plenty of wholesome raw food on hand and eat whenever our bodies tell us to, not according to artificial meal-time standards. We make sure no one around us goes hungry, because we know that good food is an essential requirement of life. We acknowledge that some of us were raised on the system's food, or 'distortion' as we call it. Doing the work we do can also put us under a lot of pressure when parent or child or husband and wife are separated by the system's oppression. So it is not uncommon to see some of us eating cooked food on occasion. However, you will never see a committed MOVE member use drugs, cigarettes or alcohol. The hundred of miles that the system has place between us and some of our brothers and sisters in distant prisons has also forced us to use cars to maintain the close contact our family is used to. But we look forward to the day when we can live together the way we want to, without a need for air-polluting technology.' MOVE, *25 Years On The Move* (Philadelphia: Self-Published, 1997), 71" (Heq-m-Ta 2016: 135). [Ed. note: John Africa did not explicitly advocate vegetarianism or veganism per se but rather advocated that humans reject the entire technological industrial complex, including that which incarcerates and imprisons animals. Since the police killing of MOVE people by police in 1985, the organization fell into the leadership of Alberta Africa leading ultimately to claims of abuse, suspicions around the unresolved murder of her ex-husband John Gilbride in 2002, and an

On a related note, straight edge subculture has similarly prized self-discipline and personal health. Never heard of straight edge? Maybe you've heard of Rage Against the Machine? RATM's vocalist Zack de la Rocha started in California hardcore band Inside Out, taking influence from the originators of straight edge, DC band Minor Threat. From the introduction to "My Vegan Straight Edge is Anything but White: An Indigenous Anarchist Critique of Speciesism and Intoxication Culture" (2017):

Straight Edge is the politics of regaining control over one's self, and of taking back from those who wish to enslave and control. It is the politics of rejecting the "values" and toxic traditions that have been instilled in civilized society. In a system dependent on the intoxication and ignorance of people, sobriety is a refusal to comply with, and rebellion against the system.

Intoxication Culture is a set of institutions, behaviors, and mindsets centered around the consumption of drugs and alcohol. Living drug-free and sober is considered important when considering how the prison-industrial complex utilizes the "war on drugs" for expansion as well as war on communities of color and the revenue generated by the government for toxic consumerism. Many view straight edge as crucial for maintaining focus, helping to effectively fight against the capitalist, colonial and hetero-patriarchal society without substances that may impair judgement, reduce the capacity to function, or undoubtedly exploit others. Such focus also offers a rare clarity in this miserable world to manage life and love, without destroying friendships and relationships.

Veganism is the rejection of the commodity status of non-human animals and subsequent resistance to consuming non-human animal products. People have been conditioned to believe the human species is inherently superior to all other species, and are offered privileges and rights accordingly. Not only are these privileges and rights denied to non-humans, but in combination with cultural, interpersonal, and political relationships, it is believed they exist explicitly for humans to use. This discriminative, exploitative and oppressive belief system is called speciesism. The abuse and slaughter of non-humans is profitable, and to capitalists the prospect of limitless profit is irresistible. In opting for a vegan diet and lifestyle, continuously abstaining from actions which contribute to the suffering of all species, radical veganism strands in defiance and opposition to this.

Radical veganism goes beyond ceasing to buy non-human animal products, and buying vegan ones instead. Unlike vegan capitalists, "radical veganism" recognizes the colonial, patriarchal food paradigm, speciesism and the links between capitalism and human exploitation, capitalism and non-human animal exploitation. In pursuit of total liberation,

exodus of more than a dozen MOVE people in 2021, see Jason Nark, "Ex-MOVE members say they were raised in a 'cult' where abuse and homophobia ran rampant," *Philadelphia Inquirer*, 27 August 2021; Mike Africa, Jr. "My Life in MOVE: the Good, the Bad, and the Ugly Part 2: The Bad." 2 September 2021 <https://podcasts.apple.com/us/podcast/my-life-in-move-the-good-the-bad-and-the-ugly-part-2-the-ugly/id1543983672?i=1000534098413>].

the abolition of capitalism, along with all other forms of oppression and hierarchy, such as those that perpetuate human supremacy is necessary.

From “Straight Edge Anarchy: The Dangers of a Sober Insurrection” by “some insurrectionary queers of the sober kind”:

Intoxication: derived from the Latin word *intoxicatio*, meaning “to poison one’s self.” Intoxication culture is a set of institutions, behaviors, and mindsets focused on the consumption of drugs, alcohol, and tobacco use. Intoxication culture facilitates the anesthesia promoted by those in power who seek to disempower and pacify the enslaved. As an antithesis of self-liberation, intoxication culture promotes defeatism through the internalization of self-hatred and pity.

On a global scale capitalism not only manifests its destruction environmentally but also in the form of self-destructive actions and behaviors which have become normalized as a traditional development of civilization. As a coping mechanism, intoxication becomes an accepted part of daily life, whether it be as a reward for a long hard week of wage-slavery, or a self-prescribed sedative and so on.

Intoxication culture is self-perpetuating and captures the idea of rebellion through self-destruction. Often an individual manifests depression and anger cultivated by preexisting oppressive external forces, through a variety of self-destructive actions. Rebellion in this sense is internalized as self-hatred, apathy, and self-pity. As self-hatred, depression, and feelings of inferiority become exacerbated by addiction, profits soar for capitalists. Rather than directly confronting problems that exist in one’s life, an individual becomes dependent on a source which provides temporary escape. Escapism becomes an alternative life of apathy through toxic consumerism. As nourishment for self-pity, hopelessness, and apathy, intoxication acts as an agent of consolement.

[...] Alcohol was an integral part of the colonization process. Everything from creating alcoholic abusive behavior within what used to be peaceful Native groups and tribes to pacifying slave revolts. European Christian colonists used alcohol as a chemical weapon of warfare in their genocidal and ethnic cleansing, mistreatment, and exploitation of indigenous peoples. Alcohol and tobacco became tools of privilege creating hierarchy as those who had more access to these could sell them for the labor of others. Once tobacco became known for its profit, indigenous people, slaves, and indentured servants were put to work on lands that were taken by brutal force from the Natives. Alcohol and drugs were used for their pacifying and numbing effects. As the wild and free became more intoxicated and distracted from the reality of their rapidly changing existence, they began to internalize the hatred imposed upon them. With the development of an identity crisis the process of assimilation took place as many indigenous and other people of color became a target for capitalists who profit from social intoxication” (published in Kuhn 2019: 239-240).

Personally, I tend to think that, rather than quit addictions entirely, people often trade one (more harmful or stigmatized) addiction for another (less harmful or socially acceptable) addiction, like going from alcoholism to workoholism, or from over-eating to over-shopping, or from drugs to music. Maybe some of us find balance not by eradicating all addictions but by playing different addictions off of one another, creating a relatively

stable ecology of addictions in which some less destructive ones (such as workoholism or addiction to exercise) can temper other ones and vice versa. One might replace addiction to a certain “rush” or “high” acquired by a substance with a similar feeling acquired by community, relationships, achievements, or music. A lot of these aspects can intersect in music scenes such as straight edge. One might think of music as a ritual brain storm, taking over our minds with chemical flooding, temporarily transforming and/or obscuring our landscape while, at the same time, (re)connecting us with the world around us in an intimate fashion, a psychic fluid bridge between the world outside of us and the world inside of us. Straight edge came out of a hardcore punk music scene and I know that a lot of people (myself included) have found music an incredibly powerful way to both bond with others (reconnecting community) and acquire a sort of “high” without chemicals. But music for the last 80 years or so largely gets its power through electricity and that too has ecological consequences. I don’t judge it but I can’t deny it. Living within this system always means some sort of addiction to resource depletion and ecological destruction.

One can also find a “replacement addiction” in “spirituality”. Straight edge does that too and often connects further to other groups or traditions. (See Eeyore 2022 for the anti-drug, deep ecology, vegan Hardline scene).

The XXX symbol marks the ‘code’ or behaviours of being sXe which all adherents commit to and self-monitor, this is called “claiming edge”. Each of the X’s represent one of the three things that adherents abstain from: drugs (including tobacco), alcohol and casual sex. Some adherents will also add veganism, caffeine or even pharmaceutical drugs. The purpose of abstaining is two-fold; first to have a clear or better understanding of the world, the belief being that intoxicants prevent you from fully paying attention and the second to ensure that one does not contribute to the profit and power of companies who exist solely to make money from products that are considered poisonous or harmful, or who profit from toxic representations of sex, the pursuit of sex and gender expectations. Claiming edge can only be undertaken once in a lifetime, akin to a wedding vow it is irreparable if not adhered to (called “breaking edge”) although breaking it will seldom result in ostracism from the community. Although the claiming of edge is often talked of in regards to resistance, anti-capitalism and taking responsibility for one’s actions and choices, it is often, though not always, also connected with long family histories of alcohol and/or drug addiction and the abuse that can be a part of that. It is also not uncommon to have sXe adherents talk about being sXe as part of their own recovery plan from addiction.

[...] Within sXe there was a move towards embracing carefully chosen aspects or traditions such as Hare Krishna, Buddhism, Islam and Christianity by a minority of adherents, whilst many others sought some way to create a sense of wonder, awe, mystery, community, identity and even the numinous through sXe itself. Interviewees often explained this as wanting to find something that would help them find or recapture something larger than themselves, or something they couldn’t easily explain. Their implicit religion of sXe is a re-enchantment understood as something which enables them to be caught up, either momentarily or for longer, both within the moment and in an acute awareness that they are a part of something larger than themselves. It is the animation of nature and the cosmos that delights and charms us in a way nothing else can and that leaves us altered from the experience. A significant number of interviewees referred to Straight Edge punk as their religion or their faith because it enabled them to be their authentic self and forced them to be held to account for their own actions or inactions (Stewart 2021).

So this final section focuses quite a bit on straight edge with an introduction to the topic from Gabriel Kuhn who looks at it structurally from a class struggle and social movement angle to lyrics by Earth Crisis who embody the joint struggle for sobriety, deep ecology, and animal liberation. This leads us to another structural approach that some people have engaged in to change addictive society: direct assaults on institutions. Walter Bond first served time for burning down a meth lab before later burning down a sheepskin factory. The connection between anti-drug activism and animal liberation entails working to liberate people and animals from unnecessary pain caused by specific institutions, research, and business practices. See, for example, one communiqué from the Animal Liberation Front who attacked a research lab that did drug experiments on animals:

ALF Communiqué, University of Iowa, November 14, 2004: *Multiple labs and offices in two buildings broken into & trashed, 401 animals liberated.*

The Animal Liberation Front is claiming responsibility for the liberation of 401 animals from the University of Iowa in the early hours of November 14th, 2004. All animals on the third floor of the UI psychology department—88 mice and 313 rats—were removed, examined and treated by a sympathetic veterinarian, and placed in loving homes.

Additionally, two animal labs and three vivisector's offices were entered and all contents relating to animal research were destroyed.

4th Floor, Seashore Hall: Primate researcher Joshua Rodefer's office entered. Computer discs, hard drives, paperwork and photos showing Rodefer's work confining drug-addicted primates in small glass boxes removed. The remaining paperwork detailing his monstrous work addicting primates and rats to narcotics was soaked in acid and the computer destroyed.

...Our goal is total abolition of all animal exploitation. Achieved in the short term by delivering the 401 animals from UI's chamber of hell. And in the extended term by shutting down the labs through the erasing of research and equipment used in the barbaric practice of vivisection. The entire raid was a careful and deliberate 5-pronged assault on UI's animal research.

Behind the laboratory doors we found drug-addicted rats, rats subjected to stress experiments involving loud noise, rats undergoing thirst experiments, unanesthetized rats with protruding surgical staples and oozing wounds, and mice and rats affixed with grotesque head implants. Rodefer addicts primates and rats to cocaine, methamphetamine, and PCP in redundant drug experiments. His drug possession license filed with the DEA stipulates the drugs be kept in a locked safe in the building's basement. However 2 stashes of narcotics were found in his 4th floor office, including the inside pocket of a jacket, suggesting he is himself addicted to the drugs he has for years forced on animals.³⁶

³⁶ From ALF Communiqués on Warcry Communications (2021: 121-124). *The A.L.F. Strikes Again: Collected Writings of the Animal Liberation Front in North America* and *ALF: Complete Diary Of Actions*. Warcry Communications, 2022. You can find one of his articles here: Rodefer, Joshua S., Emily R. Murphy, and Mark G. Baxter. "PDE10A inhibition reverses subchronic PCP-induced deficits in attentional set-shifting in rats." *European Journal of Neuroscience* 21.4 (2005): 1070-1076. Its title seems innocuous enough until one understands that he and his colleagues torture animals for a living. And when other researchers cite the work of animal experimentation, they implicitly condone it.

Animal Liberation today no longer means just getting animals out of tangible, visible cages, it also means preventing and hindering industry from turning all of wilderness into a cage and creating invisible cages that hinder, restrain, damage, torture, and kill animals through both mass hunting, fishing, and trapping as well as contaminants in their water, soil, blood, and air, whether antidepressants, plastics, toxins, noise pollution, light pollution, habitat destruction, motorways, “development”, and discarded nets in the seas. Get this: industry has even contaminated bees with addiction to harmful pesticides!³⁷ Human liberation from drugs, addictive industries, and intoxication culture goes hand-in-paw with liberating animals from cages for experimentation, from pollution, and from factory farms (essentially tortured so that someone can turn animals into a toxic meal for someone’s colon to respond to with cancer leading to more drugs, more experimentation, and more mutual misery). Alternatives exist for people who dare to look, question, deviate, and organize.

Finally, **Chapter 8: Toward a Theory of War, Race, Addiction, Colonialism, and Ecology (WRACE)** addresses an underlying theme throughout this anthology. If we want to adequately address ongoing ecological crises then we need to constantly connect those *material* systemic issues with *social* systemic issues such as race and addiction. Similarly, if we want to adequately address “small” issues such as addiction and racism then we need to tie them to the “big” issues of mass extinction, animal welfare, and planetary ecology.

Conclusion to the Intro

I believe in education but not academia. Not as it now stands. Parts of academia seem to function great (database storage, intellectual exchange between colleagues, etc.), parts of it function okay (peer review process, instruction curriculum, etc.) and parts of it don’t function at all or cause more damage than good (corporate involvement, racism, sexism, classism, career- or profit-biased studies, resource waste, philosophy- history- structure- and legacy of the disciplines, expertism, etc.). So, overall, academia doesn’t function to help us out of our shared eco-crises more than it contributes to it (do we really need a study to demonstrate that? Or can you pull out a calculator and add up the energy, paper, emissions, etc. used to fuel a single day of global academia vs. the “savings” of new technologies or social work or justice-oriented activities that lessen the brunt of academic and other civilizational enterprises? And maybe you can also look at the trajectory of our global and local state of affairs and see if academia has made a dent in that?).

It doesn’t suffice to have a partially functional structure. It seems equivalent to having a bike whose pedals function great but its wheels functionally partially and the steering, not at all. So if someone else has rigged that bike to ride in the direction of a steep cliff, you can pedal all you like and you can even improve the wheels, but “partially functional” will not secure your survival.

So I put this together as an academic response to what Negativland did with music but in a literary sense: responsible sampling. For educational purposes only. Fair use. Zero budget. And yes, DIY. Feel welcome to try your own hand at making an academic-cookbook of intellectual ideas and suggestions that might actually relate to the struggles we face so urgently.

³⁷ See, for example, Karl Mathiesen, “Bees may become addicted to nicotine-like pesticides, study finds,” *The Guardian*. 22 April 2015.

I don't engage in the details of theories or choose sides about addiction therapy. Partially because I don't know enough about it. Besides, usually, as it often turns out in academia, each side has some valid points and can have validity to some degree and in some fashion. If you want to know what works better for you or other people struggling with addiction around you, then just experiment. Try different ways of thinking, different ways of behaving, and see where it leads. Then compile your set of thoughts and stories related to that, and, if useful, share it with the rest of us.

Carl Erik Fisher mentioned Ernst Pöppel who (jokingly) coined the term monocausotaxophilia to describe "the love of single causes that explain everything" (Fisher 2022: 33). This seemed applicable to a lot of areas and, strikingly, probably a more accurate term than "conspiracy theory" to describe many supposed "conspiracy theories" because they amount to the delusion that we can narrow down any number of problems or crises to the activities of one specific group. We tend to underestimate the complexity of systems and ecologies in general. Subsequently, if many observers of addiction suffer from monocausotaxophilia then it applies even more to people trying to pin ecological crises down to single causes (even supposed green advocates who repeatedly single out emissions and "climate change" as the seemingly only single ecological issue worth taking seriously). And here, education can fill a very useful function in helping us think critically, more complexly, and with more nuance about challenges that we certainly cannot reduce to a single cause or single problem.

This book came about due to a lacuna in research. "Lacuna" means a gap. A hole. A big gaping wound of nothingness where one might otherwise have found plenty of books, anthologies, and even university programs and degrees in the field. No one has hitherto published a book on addiction and ecology that I know of. So here you have it.

The lacuna stunned me because I could not fathom how such a central and obviously critical intersection of fields (addiction and ecology) could have eluded anyone's radar. We seemingly live in the End Times of Climate and Biodiversity Apocalypse. Why would not addiction researchers want to note the powerful implications of addiction on ecology? We also live in times in which our high-stress, technophilic world seems to spawn newer and more intense addictions than ever before. If the younger generation of the Global North has opted to drink less alcohol, they do not have fewer addictions. From Internet to cell phones, from "social" media to ecstasy, from porn to online dating, from workoholism to shopoholism, addiction characterizes the parameters and content of the institutions, lifestyles, and daily routines that drive eco-destruction ever forward. Why would not any ecologist or environmentalist want to look at addiction as a primary piece of the Climate and Biodiversity Apocalypse puzzle?

None of this made sense to me. So now you dear readers, scholars, and activists have a book on the topic so you can help make better sense of the world mighty quick. (Oops, didn't mean to rush you. That could, of course, trigger your own addictions.) I don't have a degree in either ecology or addiction studies but, in the spirit of DIY zine-making on a zero budget, I can provide a variety of material here for people to make their own decisions. The main point? Let's not only get this conversation started, but let's make it a centerpiece of social struggle because unless we face addictions honestly and effectively, I don't see how we will have even a chance at successfully addressing the myriad of eco-crises that human institutions such as industry and its many corresponding addictions have helped produce. Now, with that said, I leave it to the respective authors to describe the topic from their (research) angle and to readers to use this *as a resource manual for action*.

References

- Africa, Edward. "Some Questions About MOVE: Edward Africa, Minister of Defense to the MOVE Org., Responds." *First Day* 4 (1994): 9.
- Africa, Janine. "America the Free?" *First Day* 24 (2001): 10.
- Alexander, Bruce K. "The Globalization of Addiction." *Addiction Research* 8, no. 6 (2000): 501-526.
- Ambler, Charles. "Drugs in Africa from the Slave Trade to Colonialism." In: *The Oxford Handbook of Global Drug History*, edited by Paul Gootenberg, 192-210. New York: Oxford University Press, 2022.
- Belina, Bernd. "Anglophones: If you Want us to Understand You, You Will Have to Speak Understandably! A Humble Proposition Concerning Paper Presentations by Native English Speakers at International Conferences." *Antipode* 37, no. 5 (2005): 853-854.
- Best, Steven. *The Politics of Total Liberation*. New York: Palgrave Macmillan, 2014.
- Boff, Leonardo. *Ecology and Liberation: A New Paradigm*. Maryknoll, NY: Orbis Books, 1995.
- Branagan, Marty. *Global Warming, Militarism and Nonviolence: The Art of Active Resistance*. Basingstoke: Palgrave Macmillan, 2013.
- Burnett, Richard, *et al.* "Global Estimates of Mortality Associated with Long-Term Exposure to Outdoor Fine Particulate Matter." *Proceedings of the National Academy of Sciences* 115, no. 38 (2018): 9592-9597.
- Cheagle, R. *The Colored Temperance Movement* (Unpublished thesis). Washington, DC: Howard University, 1969.
- Cohen, M., *et al.* "A Critical Look at Animal Experimentation." *Vaccine* 23 (1998):1- 24.
- Courtwright, David T. *The Age of Addiction: How Bad Habits became Big Business*. Cambridge, MA and London: Harvard University Press, 2019.
- Douglass, Frederick. *My Bondage and My Freedom*. New York, NY: Miller, Orton, & Mulligan, 1855.
- Edwards, Ruth W., *et al.* "Community Readiness: Research to Practice." *Journal of Community Psychology* 28, no. 3 (2000): 291-307.
- Eeyore, Phoenix X. *Total Revolution?: An Outsider History of Hardline*. Warcry Communications, 2022. <https://archive.org/details/an-outsider-history-of-hardline>
- Fish, Lorraine M. *Nature, Culture, and Abnormal Appetites: An Ecopsychological Analysis of Addiction*. Riga: VDM Verlag Dr. Müller, 2009.
- Fisher, Carl Erik. *The Urge: Our History of Addiction*. Melbourne and London: Scribe, 2022.
- Frisone, Fabio. "Why Do We Call it Addiction? Epistemological Reflections on the World of Addiction." *Mediterranean Journal of Clinical Psychology* 9, no. 2 (2021): 1-6.
- Granfield, Robert. "Addiction and Modernity: A Comment on a Global Theory of Addiction." *Nad Publication* 44 (2004): 29-34.

- Greenfield, Patrick and Phoebe Weston. "The five biggest threats to our natural world ...and how we can stop them." *The Guardian*. 14 October 2021. <https://www.theguardian.com/environment/2021/oct/14/five-biggest-threats-natural-world-how-we-can-stop-them-aoe>
- Hallmann, Caspar A., *et al.* "More than 75 Percent Decline over 27 Years in Total Flying Insect Biomass in Protected Areas." *PLoS One* 12, no. 10, 2017: 1-21.
- Hickman, Timothy A. "Drugs and Race in American Culture: Orientalism in the Turn-of-the-Century Discourse of Narcotic Addiction." *American Studies* 41, no. 1 (2000): 71-91.
- Illich, Ivan. *Toward a History of Needs*. New York: Pantheon Books, 1978.
- Interlandi, Jeneen. "12 Americans Die of an Overdose Every Hour. We Have the Knowledge to Prevent That." *New York Times*. 24 June 2022. <https://www.nytimes.com/2022/06/24/opinion/addiction-overdose-mental-health.html>
- Kassam, Ashifa. "Cigarette butts: how the no 1 most littered objects are choking our coasts," *The Guardian*, 18 August 2022. <https://www.theguardian.com/environment/2022/aug/18/cigarette-butts-how-the-no-1-most-littered-objects-are-choking-our-coasts>
- Kuhn, Gabriel. *Sober Living for the Revolution: Hardcore Punk, Straight Edge, and Radical Politics*. Oakland, CA: PM Press, 2010.
- Kuhn, Gabriel (Ed.) *X: Straight Edge and Radical Sobriety*. Oakland, CA: PM Press, 2019.
- LaVallie, Carrie, and JoLee Sasakamoose. "Promoting Indigenous Cultural Responsivity in Addiction Treatment Work: The Call for Neurodecolonization Policy and Practice." *Journal of Ethnicity in Substance Abuse* (2021): 1-23.
- Lawn, Philip. "Biodiversity and the Human Factor. The Need to Overcome Humankind's Addiction to Growth." In *The Importance of Biological Interactions in the Study of Biodiversity*, Edited by J. López-Pujol-Rijeka, 339-354. Croatia: IntechOpen, 2011.
- Malcolm X and Alex Haley. *The Autobiography of Malcolm X*. New York: Grove Press, Inc., 1964.
- Malcolm X. *Malcolm X Speaks: Selected Speeches and Statements*. New York: Grove Press, 1965: 23-44.
- Maté, Gabor. "The Power of Addiction and the Addiction to Power." *Mad In America*. <https://www.madinamerica.com/2022/03/the-power-of-addiction-and-the-addiction-to-power-gabor-mate-md/>
- Merchant, Carolyn. *Radical Ecology: The Search for a Livable World*. New York and London: Routledge, 2005.
- Moane, Geraldine. "Bridging the Personal and the Political: Practices for a Liberation Psychology." *American Journal of Community Psychology* 31, no. 1 (2003):91-101.
- Novotny, Thomas E. *et al.* "The Environmental and Health Impacts of Tobacco Agriculture, Cigarette Manufacture and Consumption." *World Health Organization*, 2015. <http://www.who.int/bulletin/volumes/93/12/15-152744/en/>

- Peele, Stanton. "The Seductive, But Dangerous, Allure of Gabor Maté." *Psychology Today*, 5 December 2011. <https://www.psychologytoday.com/us/blog/addiction-in-society/201112/the-seductive-dangerous-allure-gabor-mat>
- Peet, Richard and Michael Watts. *Liberation Ecologies: Environment, Development and Social Movements*. London: Routledge, [1996] 2004.
- Pellow, David Naguib. *Total Liberation*. Minneapolis and London: University of Minnesota Press, 2014.
- Quintero, G. "Making the Indian: Colonial Knowledge, Alcohol, and Native Americans." *American Indian Culture and Research Journal* 25, no. 4 (2001): 57-71.
- Szalavitz, Maia. *Unbroken Brain: A Revolutionary New Way of Understanding Addiction*. New York: St. Martin's Press, 2016.
- Stewart, Francis. "'Save my Soul from the Poisons of this World': Straight Edge Punk and Religious Re-enchantment." In: *Exploring the Spiritual in Popular Music. Bloomsbury Studies in Religion and Popular Music*, 175-192. London: Bloomsbury, 2021.
- Watts, Jonathan. "The world has two years to secure a deal for nature to halt a 'silent killer' as dangerous as climate change, says biodiversity chief." *The Guardian*. 6 November 2018. <https://www.theguardian.com/environment/2018/nov/03/stop-biodiversity-loss-or-we-could-face-our-own-extinction-warns-un>
- White, W., M. Sanders, and T. Sanders, T. "Addiction in the African American Community: The Recovery Legacies of Frederick Douglass and Malcolm X." *Counselor* 7, no. 5 (2006): 53-58.
- WHO Framework Convention on Tobacco Control: An Overview. Geneva: World Health Organization; 2015. Available from: http://www.who.int/fctc/about/WHO_FCTC_summary_January2015.pdf?ua=1
- WHO. "More than 90% of the world's children breathe toxic air every day." World Health Organization. 2018. <https://www.who.int/news/item/29-10-2018-more-than-90-of-the-worlds-children-breathe-toxic-air-every-day>
- WHO. "Tobacco." World Health Organization. 2022. <https://www.who.int/news-room/fact-sheets/detail/tobacco>
- Wilshire, Bruce. *Wild Hunger: The Primal Roots of Addiction*. New York: Rowman & Littlefield, 1999.
- Wilt, James. "Britain has a drinking problem—and the alcohol industry can't afford to let us kick it." *The Guardian*. 31 July 2022. <https://www.theguardian.com/commentisfree/2022/jul/31/britain-unhealthy-drinkers-alcohol-industry>
- Wood, Laura CN. "Child Modern Slavery, Trafficking and Health: A Practical Review of Factors Contributing to Children's Vulnerability and the Potential Impacts of Severe Exploitation on Health." *BMJ Paediatrics Open* 4, no. 1 (2020): 1-11.
- Wright, Ashley. "Opium in British Burma, 1826–1881." *Contemporary Drug Problems* 35, no. 4 (2008): 611-646.

2: History of Addiction: Colonialism, Enslavement, and Economics

Historical and Cultural Aspects of Wo/Man's Relationship with Addictive Drugs

by Marc-Antoine Crocq

Our taste for addictive psychoactive substances is attested to in the earliest human records. Historically, psychoactive substances have been used by (i) priests in religious ceremonies (e.g., *amanita muscaria*); (ii) healers for medicinal purposes (e.g., opium); or (iii) the general population in a socially approved way (e.g., alcohol, nicotine, and caffeine). Our forebears refined more potent compounds and devised faster routes of administration, which contributed to abuse. Pathological use was described as early as classical Antiquity. The issue of loss of control of the substance, heralding today's concept of addiction, was already being discussed in the 17th century. The complex etiology of addiction is reflected in the frequent pendulum swings between opposing attitudes on issues that are still currently being debated, such as: is addiction a sin or a disease; should treatment be moral or medical; is addiction caused by the substance; the individual's vulnerability and psychology, or social factors; should substances be regulated or freely available.

This paper endeavors to discuss (i) the cultural history of wo/man's relationship with addictive drugs; and (ii) the historical roots of the science of addiction. The first part deals with addictive substances and their "*normal*" patterns of use across different epochs. The second part is about the recognition of *pathological use* and the appearance of the science of addiction, the definition of drug use as a disease and its inclusion in the medical constituency, and the evolution of views on etiology and intervention.

Our early ancestors lived as hunter-gatherers and—as shown by the culture of human groups who retained this lifestyle (e.g., Australian aborigines, Amazon Indians, or Kalahari desert Bushmen)—they undoubtedly collected considerable information on pharmacological plants. Ötzi, the man whose frozen body was recovered in the Alps in 1991, lived about 3300 years BC, and carried in his pouch a travel pharmacy including a polypore fungus with antibacterial and hemostatic properties. After adopting a pastoral lifestyle, humans may have observed the effects of psychoactive plants on their flocks. Tradition has it that Ethiopian priests started roasting and boiling coffee beans to stay awake through nights of prayer after a shepherd noticed how his goats were frolicking after feeding on coffee shrubs.

Addictive substances and cultural patterns of use

Schematically, psychoactive substances have been used (i) in religious ceremonies by priests; (ii) for medicinal purposes; or (iii) massively, as staple commodities, by large segments of the population in a socially approved way. Dominant patterns of use varied according to epochs and places. An important parameter was the degree of a drug's acculturation. For instance, New World plants such as tobacco (nicotine) and coca (cocaine) are relative newcomers to the Old World. Conversely, poppy (opium) and hemp (cannabis) originated in Eurasia.³⁸ In contrast, alcohol can easily be produced by the action of yeast on a variety of plants containing starch or sugar, and has been used by virtually all cultures.³⁹ Surprisingly, however, alcohol was largely unknown throughout much of North America before the arrival of Europeans. The sudden destructive impact of alcohol on North American native cultures might be explained by the fact that traditional patterns of use had not been established; another possible factor may be the lack of previous genetic selection operating on vulnerable subjects over millennia.

Religious use

Priests or shamans have ingested plants for millennia to induce states of dissociative trance. Such substances are sometimes termed "entheogenic" (from the Greek roots "*en*" [inside], "*theo*" [god], and "*gen*" [create]). The mushroom *Amanita muscaria*, commonly known as fly agaric, has been at the center of religious rituals in Central Asia for at least 4000 years. Children know this beautiful white-spotted red mushroom from the illustrations of fairy tales and Christmas cards. *Amanita muscaria* had a religious significance in ancient India, and travelers recorded its use as late as the 18th century in Northeastern Siberia. It was an ingredient of *Soma*, a sacred beverage in the Rigveda in ancient India, and also of *Haoma*, a sacred beverage mentioned in the Avesta, the ancient scriptures of Zoroastrianism.^{40,41} Etymologically, *soma* and *haoma* are the same words. It has long been thought that muscarine, a cholinergic substance discovered in 1869 in *Amanita muscaria* (hence the name), was the hallucinogenic compound. In fact, the hallucinogenic compounds are ibotenic acid and muscimol. In Central America, psilocybe mushrooms were used for the same purposes. Mushrooms of this genus contain the psychoactive compounds psilocin and psilocybin. Indigenous people in pre-Columbian Mexico, and also the Navajo in the southwestern United States, used peyote (*Lophophora williamsi*) to trigger states of spiritual introspection. This cactus contains psychoactive alkaloids, notably mescaline.

Medicinal use

Some drugs have been used as medications for most of human history. For instance, the medicinal use of opium is described from the earliest written records. *Nepenthes pharmakon* is mentioned in the 9th century BC in Homer's *Odyssey* (4, 221). It is written that the beautiful Helen of Troy had received this potion from an Egyptian queen and that she used it to treat the Greek warriors

³⁸ Vetulani J. "Drug addiction. Part I. Psychoactive substances in the past and present." *Pol J Pharmacol*. 2001;53:201-214.

³⁹ Frank JW, Moore RS, Ames GM. "Historical and cultural roots of drinking problems among American Indians." *Am J Public Health*. 2000;90:344-351.

⁴⁰ Frank JW, Moore RS, Ames GM. "Historical and cultural roots of drinking problems among American Indians." *Am J Public Health*. 2000;90:344-351.

⁴¹ Stille G. *Kräuter, Geister, Rezepturen. Eine Kulturgeschichte der Arznei*. Stuttgart, Germany: Theiss Verlag; 2004.

(“presently she cast a drug into the wine of which they drank to lull all pain and anger and bring forgetfulness of every sorrow”). Since the 18th century, most exegetes have thought that this potion was prepared from opium. Interestingly, this preparation is qualified as a *pharmakon*, ie, a medication, in the Greek original. According to etymology (*ne*: no, and *penthēs*: grief, sorrow), *nepenthes* would be an anxiolytic or an antidepressant in today’s parlance. There is general agreement that the Sumerians cultivated poppies and isolated opium from their seed capsules at the end of the third millennium BC; they called opium “*gil*” (joy), and the poppy “*hul gil*” (the joy plant).⁴² The Ebers papyrus (c. 1500 BC), one of humankind’s oldest medical documents, describes a remedy to prevent excessive crying in children using grains of the poppy plant, strained to a pulp, passed through a sieve, and administered on 4 successive days. Homer’s *nepenthes* was perhaps similar to *laudanum*, an opium tincture attributed to Paracelsus in the 16th century. In the 19th century, *laudanum* was extensively used in adults and children, for numerous indications (insomnia, cardiac and infectious diseases). The working class largely consumed *laudanum* because it was cheaper than gin or wine, since it escaped taxation. In the early 20th century, encyclopedias in Western countries still stated that persons in good mental and physical health could use opium without risk of dependence. Griesinger (1817–1868), a German psychiatrist, one of the founders of modern psychiatry, recommended the use of opium in the treatment of melancholia.⁴³

Recreational use

Some potentially addictive drugs have been used by a significant proportion of the population on a regular basis, to the point that they have been considered staple commodities. *Alcohol*, *nicotine*, and *caffeine*, being palatable for their mild psychotropic properties, are examples of widely consumed drugs. As licit psychoactive drugs, they are used mostly by “normal” people, in contrast to illicit “hard drugs,” which are traditionally viewed as the province of the deviant.⁴⁴ Alcohol, nicotine, and caffeine have permeated our culture, serving as vehicles for social interaction, shaping our urban landscape, from the Japanese teahouse to the British pub, stimulating the opening of international trade routes. Similarly, hashish (cannabis) has been largely consumed—eaten and later smoked—in Islamic cultures. All these substances have a long history, intricately interwoven with myth, bearing witness to wo/man’s predilection for psychoactive substances. The oldest seeds of cultivated vines so far discovered and carbon dated were found in Georgia and belong to the period from 7000 to 5000 BC.⁴⁵ According to Jewish and Christian tradition, one of Noah’s first actions after coming out of the Ark was to plant a vineyard; he drank some of its wine and became drunk (Genesis 9, 20-21). Coffee was largely used throughout the Islamic world at the end of the 15th century. Its use spread rapidly in Europe, and Europeans introduced coffee plants into their colonies. Tea’s history is much older, since the plant was already being harvested in China in the 3rd century BC.

These staple commodities have long been the object of official attention, for the purpose of collecting excise tax rather than controlling abuse. In order to extract revenues, rulers in

⁴² Brownstein MJ. “A brief history of opiates, opioid peptides, and opioid receptors.” *Proc Natl Acad Sci USA*. 1993;90:5391-5393.

⁴³ Jackson SW. *Melancholia and Depression. From Hippocratic Times to Modern Times*. New Haven, Conn: Yale University Press; 1986.

⁴⁴ Crocq MA. “Alcohol, nicotine, caffeine and mental disorders.” *Dialogues Clin Neurosci*. 2003;5:175-185.

⁴⁵ Johnson H. *The Story of Wine*. London, UK: Octopus Publishing Group; 1989.

Ancient Egypt and Babylon established production or sales monopolies.⁴⁶ Ordinances limiting consumption have coexisted and alternated with free supply, in close temporal and geographic proximity. Temperance movements led to a clear decrease in liquor use in Western Europe in the early 20th century, culminating with prohibition in the United States (from 1920 to 1933) and in a few Nordic countries. In preceding centuries, tobacco and cannabis had also known prohibition. Smokers ran the risk of having their lips cut under the first Romanov tsar, Michael Fiodorovich, or of being beheaded under the Ottoman sultan Murad IV. In 1378, the Ottoman emir in Egypt, Soudoun Sheikhoui, was determined to stamp out hashish use: farmers growing hashish were imprisoned or executed, and those found guilty of consuming were said to have their teeth pulled out.⁴⁷

Devising more potent compounds

In the course of history, many psychotropic plants have been refined and administered through new routes, allowing faster access to the brain in higher concentrations. The fermentation of cereals containing starch produces beer with an alcoholic content of around 5%, whereas the same process with grape sugar yields wine containing up to 14% alcohol. Distillation made it possible to obtain beverages with a much higher alcohol content. People could drink alcohol with strength of 50% and more, making it easier to become drunk. The construction of stills, associating an alembic to distill a liquid with arrangements to condense the vapor produced, seems to have started only in the 11th or 12th century around the medical school of Salerno in Italy.⁴⁸ Distillation, though it did not create the problems with alcohol, could intensify them.⁴⁹ The “water of life,” as it was called in many languages (Latin *aqua vitae*) conquered Europe with great speed. That name still survives, as in the Danish *akvavit* and through the Gaelic *uisge beatha* to the English whisky. In England, drunkenness was to become connected with distilled spirits, especially gin, as dramatically pictured in Hogarth’s *Gin Lane*. Alcohol without liquid (AWOL) is a more recent process that allows people to take in liquor (distilled spirits) without actually consuming liquid. The AWOL machine vaporizes alcohol and mixes it with oxygen, allowing the consumer to breathe in the mixture. Vaporized alcohol enters the bloodstream faster, and its effects are more immediate than its liquid counterparts, producing a euphoric high. Traditionally, coca leaf is chewed in the regions of production in Southern America, for instance by Andean miners to diminish fatigue. At the other pharmacokinetic extreme, the smoking of crack cocaine produces short-lived and intense effects that are felt almost immediately after smoking. Opium is another example of a substance whose pattern of use changed in the last centuries, from a medication used for pain relief and anesthesia to a substance associated with abuse and dependence. Opium’s capacity to induce dependence was probably bolstered by the recent purification of morphine, and the synthesis of heroin, more potent compounds that are available for injection. Similarly, cigarettes, which allow nicotine to be rapidly absorbed into the bloodstream and to reach the brain in a few seconds, were associated with more dependence than previous modes of tobacco use (snuff, cigars, chewing) which did not promote deep inhalation into the lungs.

⁴⁶ 9. Austin GA. *Alcohol in Western Society from Antiquity to 1800. A Chronological History*. Santa Barbara, Calif: ABC-Clio; 1985.

⁴⁷ Booth, M. *Cannabis. A History*. London, UK: Doubleday; 2003.

⁴⁸ Forbes, R. J. *A Short History of the Art of Distillation*. Leiden, the Netherlands: E. J. Brill; 1970.

⁴⁹ Keller, M. “A historical overview of alcohol and alcoholism.” *Cancer Res*. 1979;39:2822-2829.

The historical roots of addiction medicine

Chronological milestones

Abnormal patterns of substance use have been described since antiquity, at least since Alexander the Great's death in 323 BC was precipitated by years of heavy drinking. Aristotle recorded the effects of alcohol withdrawal and warned that drinking during pregnancy could be injurious.⁵⁰ The Roman physician Celsus held that dependence on intoxicating drink was a disease.⁵¹ The birth of addiction medicine in modern times is sometimes credited to Calvinist theologians who offered explanations for the phenomenon of compulsive drinking, which were later accepted by physicians.⁵² Dr. Nicolaes Tulp, a Dutch physician depicted in Rembrandt's painting "The Anatomy Lesson," adapted theological models to explain the loss of control over various types of behavior (1641). In this process, what was considered sinful behavior was given medical explanations. A few decades later, one of Tulp's colleagues, Cornelius Bontekoe, applied his teaching to the progressive loss of willful control over alcohol intake. With the colonial era, industrial revolution, and international trade, addiction became a global public health problem. In the 18th century, opium's addictive potential was recognized when a large number of Chinese people became addicted, and the Chinese government tried to suppress its sale and use. In Europe, the working classes were threatened by alcoholism.⁵³ At that time, psychiatry had matured into a scientific discipline, established nosological classifications, and taken stands on societal issues. The American physician Benjamin Rush, writing in the 18th century, maintained that compulsive drinking was characterized by a loss of self-control, and that the disease was primarily attributable to the drink itself and not the drinker. His remarks concerned only strong liquors; wine and beer, in his view, were salutary thirst- quenchers.⁵⁴ In German-speaking countries, the most influential physician was Constantin von Brühl-Cramer, who is credited with coining the term "dipsomania" ("*Über die Trunksucht und eine rationelle Heilmethode derselben*" [1819]). Dedicated medical journals were created in the 19th century. The Journal of Inebriety appeared in the United States in 1876, while the British Journal of Addiction was first published in 1884. Emil Kraepelin, the physician who exerted the greatest influence on the shaping of modern psychiatry, fought alcohol with extreme dedication.⁵⁵ He published the first psychometric data on the influence of tea and alcohol in the early 1890s. As a result of his research, he came to the conclusion that chronic alcoholism provoked cortical brain lesions that led to a permanent cognitive decline. Drawing from personal consequences, Kraepelin became a teetotaler in 1895. Before that, he had been a moderate drinker, recognizing alcohol's relaxing and mood-elevating effects, as in this letter to the psychiatrist August Forel in December 1891: "...I have often found that, after great exertion, and also after severe mood depression, alcohol

⁵⁰ O'Brien, J.M. "Alexander and Dionysus: the invisible enemy." *Ann Scholarship*. 1980;1:83-105.

⁵¹ Berrios, G., R. Porter (eds.) "A History of Clinical Psychiatry." *The Origin and History of Mental Disorders*. London, UK: The Athlone Press; 1995:656.

⁵² Wassenberg, K. "Deutsches Archiv für Temperenz-und Abstinenzliteratur." Available at: www.sgw.hs-magdeburg.de. Accessed August 2007.

⁵³ Hübner, M. *Zwischen Alkohol und Abstinenz. Trinksitten und Alkoholfrage im deutschen Proletariat bis 1914*. Berlin, Germany: Dietz Verlag; 1988.

⁵⁴ Gerritsen, J. W. *The Control of Fuddle and Flash: A Sociological History of the Regulation of Alcohol and Opiates*. Leiden, the Netherlands: Brill; 2000.

⁵⁵ Engstrom, E.J. "Emil Kraepelin: Psychiatry and public affairs in Wilhelmine Germany." *Hist Psychiatry*. 1991;2:111-132.

has had a clearly beneficial effect on me....”⁵⁶ Kraepelin was particularly concerned about the social and genetic consequences of alcohol. Sigmund Freud, a contemporary of Kraepelin, laid the ground for the psychological approach to addiction. Freud wrote in a letter to Fliess in 1897: “...it has dawned on me that masturbation is the one major habit, the ‘primal’ addiction and that it is only as a substitute and replacement for it that the other addictions—for alcohol, morphine, tobacco, etc.—come into existence.”⁵⁷ A consequence of the psychological approach is that the addiction to different substances (alcohol, opiates, etc.) and even to certain types of behavior, such as gambling, have been gathered together under a common denominator, and regarded as different expressions of a single underlying syndrome. Interestingly, the Qur’an warns against both wine (*khamr*) and gambling (*maisir*) in the same sura (2, 219). In the 20th century, addiction medicine has been enriched by (i) diagnostic classifications and (ii) neurobiological and genetic research. Louis Lewin published his influential classification in 1924, distinguishing between stimulants (nicotine; caffeine-containing compounds such as coffee, tea, mate); inebriants (alcohol, ether); hallucinogens (lysergic acid diethylamide [LSD], peyote); euphorants (cocaine; opium derivatives such as morphine, codeine, heroin); and hypnotics. Also, animal research and functional brain imaging studies in humans have led to the current influential hypothesis that all drugs of abuse share a common property in exerting their addictive and reinforcing effects by (i) acting on the brain’s reward system and (ii) conditioning the brain by causing it to interpret drug signals as biologically rewarding or potentially salient stimuli comparable to food or sex. Cues associated with morphine, nicotine, or cocaine activate specific cortical and limbic brain regions. This conditioning involves the pre-frontal cortex and glutamate systems. However, in rats, this pattern of activation displays similarities to that elicited by conditioning to a natural reward—highly palatable food such as chocolate.⁵⁸ Confronted by cues that serve as drug reminders, the individual experiences craving, and the degree of voluntary control that he or she is able to exert may be impaired. This hypothesis is partly derived from Pavlov’s conditioning paradigm, where food is equated to cocaine, the animal’s salivation to cocaine craving, and the bell to the drug cue.⁵⁹ Family, adoption, and twin studies have demonstrated the intervention of genetic factors in addiction,⁶⁰ notably in alcohol abuse and dependence. Genetic factors interact in a complex way with the environment.⁶¹

⁵⁶ Engstrom, Eric J. “Emil Kraepelin: Leben und Werk des Psychiaters im Spannungsfeld zwischen positivistischer Wissenschaft und Irrationalität.” Masters Thesis, University of Munich, 1990. Available at: <http://www.engstrom.de/bks.htm>. Accessed August 2007.

⁵⁷ Freud, S. *The Standard Edition. Vol 1*. London, UK: The Hogarth Press; 1966: 272.

⁵⁸ Schroeder, B.E., J.M. Binzak, A.E. Kelley. “A common profile of prefrontal cortical activation following exposure to nicotine- or chocolate-associated contextual cues.” *Neuroscience*. 2001;105:535-545.

⁵⁹ Kalivas, P.W. and N.D. Volkow. “The neural basis of addiction: a pathology of motivation and choice.” *Am J Psychiatry*. 2005;162:1403-1413.

⁶⁰ Ball, D. “Genetics of addiction.” *Psychiatry*. 2006;5:446-447.

⁶¹ Rhee S.H., et al. “Genetic and environmental influences on substance initiation, use, and problem use in adolescents.” *Arch Gen Psychiatry*. 2003;60:1256-1264.; Zimmermann, U.S., D. Blomeyer, M. Laucht, K. F. Mann. “How gene-stress- behavior interactions can promote adolescent alcohol use: the roles of predrinking allostatic load and childhood behavior disorders.” *Pharmacol Biochem Behav*. 2007;86:246-262; Gorwood, P., M. Wohl, Y. LeStrat, Rouillon F. “Gene-environment interactions in addictive disorders: epidemiological and methodological aspects.” *C R Biologies*. 2007;330:329-338.

Addiction—history of a word

The definition of addiction has evolved over time. Today, addiction is defined by the characteristic features that are shared by a variety of substances: (i) the pattern of administration can progress from use, to abuse, to dependence and (ii), as discussed in the previous paragraph, a common feature of several substances is that they induce pleasure by activating a mesolimbic dopaminergic reward system, and dependence by mechanisms involving adaptation of prefrontal glutamatergic innervation to the nucleus accumbens.

The term “addiction,” in its current medical meaning, was used first in English-speaking countries, and then passed on to other languages that had used other terms previously. For instance, addiction has displaced the words *toxicomanie* or *assuétude* in French. Interestingly, the word *assuétude* (from the Latin *assuetudo* [habit]) had originally been introduced into French in 1885 to translate the English addiction.⁶² German uses non-Latin roots, such as *Abhängigkeit* (dependence), *Sucht* (addiction), and *Rausch* (intoxication). In Roman law and in the Middle Ages, addiction was the sentence pronounced against an insolvent debtor who was given over to a master to repay his debts with his work. Thus, the *addictus* was a person enslaved because of unpaid debts. According to the *Oxford English Dictionary*, the term “addict,” in the meaning of “*attached by one’s own inclination, self-addicted to a practice; devoted, given, inclined to*” has been used since the first part of the 16th century. However, addiction, in its current medical meaning of “*state of being addicted to a drug; a compulsion and need to continue taking a drug as a result of taking it in the past*” has been in widespread use only since the 20th century. In medical English, addiction replaced older terms, such as “inebriety.”

The difference between the terms dependence and addiction has long been debated. The meaning of these terms among public health professionals can only be understood in the light of their historical development. Addiction is defined as “*strong dependence, both physiologic and emotional*” in Campbell’s psychiatric dictionary.⁶³ In 1964, the World Health Organization recommended that the term drug dependence replace addiction and habituation because these terms had failed to provide a definition that could apply to the entire range of drugs in use. Historically, the archetypal model of addiction was opiates (opium, heroin), which induce clear tolerance (the need to increase doses), severe physical withdrawal symptoms when use is discontinued, and have serious consequences for the social, professional, and familial functioning of users. The spread of the concept of addiction to other substances, notably nicotine, occurred only in recent decades.⁶⁴ The diagnosis of tobacco dependence or addiction did not exist in the *Diagnostic and Statistical Manual of Mental Disorders*, 2nd ed. (DSM-II, American Psychiatric Association in 1968).⁶⁵ In the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. (DSM-IV)⁶⁶ this diagnostic category was called “nicotine” dependence instead of “tobacco” dependence. A similar historical evolution was observed with the International Classification of Diseases (ICD), the World Health Organization’s Classification of Diseases: the ICD- 10

⁶² Le Grand Robert de la Langue Française. 2e édition dirigée par A. Rey. Paris, France: Dictionnaires Le Robert; 2001.

⁶³ Campbell RJ. Psychiatric Dictionary. 7th ed. New York, NY: Oxford University Press; 1996.

⁶⁴ Berridge, V. and S. Mars. “History of addictions.” *J Epidemiol Community Health* 2004;58:747-750.

⁶⁵ American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 2nd ed. Washington, DC: American Psychiatric Association; 1968.

⁶⁶ American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington, DC: American Psychiatric Association; 1994.

Classification of Mental and Behavioral Disorders. Clinical descriptions and diagnostic guidelines (ICD-10, published in 1992,)⁶⁷ contains a category for tobacco dependence, whereas the previous classification, the International Classification of Diseases, 9th Revision (ICD 9),⁶⁸ devised in the mid 1970s, had no such specific category and offered only a category for nicotine abuse. The current labeling of “dependence” in the *Diagnostic and Statistical Manual of Mental Disorders, 4th ed., Text Revision* (DSM- IV-TR)⁶⁹ is confusing. During the preparation of the *Diagnostic and Statistical Manual of Mental Disorders, 3rd ed, revised.* (DSM-III-R),⁷⁰ committee members disagreed as to whether “addiction” or “dependence” should be adopted. A vote was taken at a committee meeting and the word “dependence” won over “addiction” by a single vote! As pointed out by O’Brien, the term “addiction” can describe the compulsive drug-taking condition and distinguish it from “physical” dependence, which is normal and can occur in anyone taking medications that affect the brain.⁷¹ For instance, pain patients requiring opiates become dependent, but are not automatically addicted.

Conclusion—a complex illness

Cultural history suggests that our relationship with drugs is more complex than the paradigm of the laboratory rat that is trained to self-administer cocaine. In most cases, we actively seek addictive drugs, and are not passive victims. History illustrates that our relationship with substances is shaped by multiple factors, including culture, society, religion and beliefs, individual psychology (addictive, anxious, antisocial personalities), cognition (addiction as a “learned” behavior), neurobiology, and genetics. Addictive behavior results from the conjunction of a substance and a personality. Addiction is not only a substance, but the way a person uses it. In other words, it is not only the drink, but also the drinker, as illustrated by the following dialogue in Shakespeare’s *Othello* (Act 2, Scene 3): Cassio—“*O thou invisible spirit of wine, if thou hast no name to be known by, let us call thee devil*” ... Iago—“*Come, come. Good wine is a good familiar creature, if it be well used.*” The etiological complexity of addiction is illustrated by a history of pendulum swings of social and medical opinion. There is no resting equilibrium on unanimous beliefs. It has been common to observe, at the same time and in the same place, the confrontation of opposing attitudes on issues such as: strict vs. broad definition of addiction (e.g., including gambling or not); laissez-faire or prohibition; punishing or treating the addict; and individual responsibility.

⁶⁷ World Health Organization. *The ICD-10 Classification of Mental and Behavioral Disorders. Clinical descriptions and diagnostic guidelines*. Geneva, Switzerland: World Health Organization; 1992.

⁶⁸ World Health Organization. *International Classification of Diseases. 9th Revision*. Geneva, Switzerland: World Health Organization; 1977:177-213.

⁶⁹ American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders. 4th ed., Text Revision*. Washington, DC: American Psychiatric Association; 2000.

⁷⁰ American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders. 3rd ed, revised*. Washington, DC: American Psychiatric Association; 1987. 35. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders. 3rd ed, revised*. Washington, DC: American Psychiatric Association; 1987.

⁷¹ O’Brien CP, Volkow N, Li TK. “What’s in a word? Addiction versus dependence in DSM-V.” *Am J Psychiatry*. 2006;163:764-765.

The Role of Dependency and Colonialism in Generating Trauma in First Nations Citizens: The James Bay Cree

by Marie-Anik Gagné

Introduction

Research on trauma among First Nations citizens has focused primarily upon the psychological aspects of posttraumatic stress disorder (PTSD). The role of sociology in this area of research is different than that of psychology. This chapter elaborates upon a general sociological discussion of the legacy of colonialism and dependency and focus on the intergenerational effects of this trauma. Figure 1 illustrates the process by which the trauma is passed on, from the seed of colonialism to the outer layer, which represents the current traumatic events being experienced by First Nations citizens. The Cree of the James Bay region in Canada are utilized to describe this figure in more detail.

This chapter has three main sections. The first includes a discussion of trauma, with emphasis on PTSD and an explanation and elaboration of Figure 1. The second section discusses, from both psychological and sociological perspectives, solutions to the trauma experienced by First Nations citizens. The third section summarizes the process by which the effects of trauma have become intergenerational among First Nations citizens.

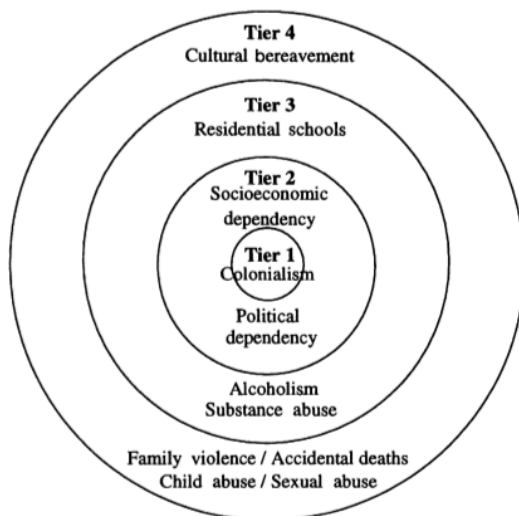


Figure 1. Cycle of traumatic events.

Defining Trauma

The concept of trauma figures more and more in the literature of First Nations (see, e.g., Manson *et al.*, 1996; Young, 1995). It appears that this concept, and, in particular, the experience of PTSD, is employed as a form of metaphor for the consequences of economic and social dependence experienced by First Nations citizens. Later sections of this chapter explore how this concept can be accurately applied to the James Bay Cree and other First Nations citizens. Before embarking on a discussion of the cause and effect of trauma, it is important to define the concept of trauma itself.

The basic definition of trauma is that of a shock that is deemed emotional and substantially damages, over a long time period, the psychological development of the victim, often leading to neurosis. The discussion of the effects of trauma on First Nations citizens usually centers around PTSD. Even with this definition of trauma, one remaining question is: What constitutes a traumatic event? The third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R); American Psychiatric Association, 1987), defined a traumatic event as a nonordinary human experience that may lead to PTSD, and which would be distressing to most people, such as serious harm or threat to self, spouse, children, close relatives or friends; witnessing a serious accident or violence against another person, who, as a result, is either killed or seriously injured; or having one's home or community suddenly destroyed.

In order to receive the diagnosis of PTSD, an individual has to “persistently experience” the traumatic event, persistently try to avoid stimuli associated with the event, experience an increased arousal (i.e., trouble falling asleep, irritability, or hypervigilance) and, finally, suffer from these symptoms for at least 1 month. The exact criteria for diagnosis are listed in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994). PTSD is, in fact, classified under anxiety disorders in the DSM-IV, as most manifestations of PTSD are also symptoms of anxiety. Symptoms accompanying anxiety disorders, such as dissociative, depressive, or somatic symptoms, arise when the body is having a conditioned emotional response to fear, severe stress, and loss.

Despite the fact that PTSD is discussed in the literature, actual data are scarce. The National Center for American Indian and Alaska Native Mental Health Research conducted three studies with the aim of further understanding trauma and PTSD in young Natives. Manson *et al.* (1996) summarized the findings of these studies conducted between 1989 and 1992. These were titled the Health Survey of Indian Boarding School Students, the Flower of Two Soils Reinterview, and the Foundations of Indian Teens Project. A total of 477 youths, ranging in age from 8 to 20, and from grades 2 to 12, were interviewed in various reserves and/or tribally controlled secondary schools in the United States and Canada. Examples of enumerated traumatic events involving the students were overdoses, shootings, car accidents, and rapes. Traumatic events not involving the students were shootings, stabbings, surgeries, beatings, car accidents, death by natural causes, suicides, murders, drownings, and auto-pedestrian accidents. Summarizing the results from all three studies, between 50.8% and 62% of the students had experienced at least one traumatic event. Of the students with a (past) history of traumatic events, between 50% and 87.4% met the DSM-III-R Criterion B (persistently re-experiences the traumatic event), 8% and 66.9% met Criterion C (persistently avoids stimuli associated with the trauma and/or psychiatric numbing), 16% to 72% of the students had persistent symptoms of automatic hyperarousal (Criterion D), and, 9% to

19% exhibited Criterion E (experiencing their symptoms for at least 1 month). In these studies, between 1.6% and 29.6% of the students met the criteria for PTSD. The latter figure is inflated due to the nature of a self-administered test distributed to the Foundation of Indians Teen Project study sample. However, Manson *et al.* (1996) report that the observed symptoms of PTSD may have been triggered by prior trauma; hence, an in-depth interview is necessary to determine the cause. Other reported mental disorders, such as anxiety and affective disorders, may have been experienced or may be comorbid to the PTSD symptoms. For example, in the Flower of Two Soils Reinterview, more than half of the students (52%, $n=32$) who experienced a traumatic event also met the criteria for diagnosis of an additional or independent mental disorder. Manson *et al.* also found that there was a direct relationship between the number of reported traumatic experiences and the likelihood of diagnosis of a non-PTSD disorder.

To briefly summarize some of the findings, Manson *et al.* (1996, 1990) and O'Neil (1989) have, in general, found a disproportionately high percentage of First Nation citizens in the United States who suffer from anxiety disorders, exposure to traumatic events, and PTSD.

THE ROLE OF THE SOCIOLOGIST

As stated in the introduction, this chapter takes a sociological approach to trauma. The role of sociologists and anthropologists is to consider trauma as dramatically changing the system of human relationships, which will, as a consequence, directly affect future generations. Hence, sociologists must consider social trauma as influencing society as a whole (Rousseau & Drapeau, 1998). This approach differs from the more individually oriented disciplines, which normally consider single individuals with a disorder related to trauma, who, in turn, transmit their behavior to the members of their family. Although Rousseau and Drapeau elaborated on this concept as a preface to studying the impact of culture on the transmission of trauma, this chapter utilizes this approach to illustrate how the James Bay Cree are continuously affected by trauma imbedded in their society.

TIER 1

Colonialism

This chapter hypothesizes that colonialism is the seed of trauma because it leads to dependency, then to cultural genocide, racism, and alcoholism. These in turn lead to sexual abuse, family violence, child abuse, and accidental deaths/suicides (Figure 1). Although colonialism is often said to be the primary source of the problems experienced by First Nations citizens, few studying PTSD among this population discuss the actual history of the people and by what means colonialism has led to dependency. O'Neil (1994) commented that it is remarkable that the Native culture has survived despite colonialism. Colonialism threatened oral traditions by decimating entire families and bands, causing the premature loss of elders who were responsible for passing on oral traditions, and creating economic dependency. Hence, First Nations had to depend on the external society in order to survive.

This section presents a discussion of the emergence of the James Bay region as a “periphery” and its people as dependents. This area was first discovered when Henry Hudson sailed his ship, The Discovery, up the Hudson river in 1611. To acquire valuable fur resources, Europeans built trading posts throughout the area. Rupert House, the first post of the Hudson’s Bay Company (HBC), was established in 1668. In the spring of 1669, the first pelts acquired from Cree hunters were brought back to London. From the very beginning, the relationship between the Europeans and the Cree was not an equal one, with the HBC fixing the scales in its favor.

Debt plays a large role in determining the level of dependence of peripheral populations. Beginning in the first half of the 18th century, the HBC made the Natives dependent on particular trading posts by extending credit to them. As the Natives left the posts in the fall, they would be given quantities of supplies for the bush, the price of which would be deducted from the value of spring furs. The amount of credit was determined by their previous season's catch, an average of 20 pelts. The HBC did this to keep the Natives trading with the Company instead of with the inland competition. Most were given a credit of 10-12 beaver pelts. The HBC found that they could manipulate the Natives into trading with them by extending this credit. However, the Company was always careful not to give too much, so that the hunter would not move to the competition once his debt accumulated or die with a large debt that the Company would have to absorb. Decades later, the HBC introduced new regulations assigning Natives to a particular post, so that they could not avoid paying their debts, thus limiting the hunter's movements from that day onward.

In 1828, the HBC began assigning not only particular trading posts but also land to hunting families, thus ensuring control of each hunter’s credit. This arrangement benefited only the Company and consequently rearranged the social organization of Natives. The HBC’s division of land had little regard for previous traplines or for nonmonogamous families. In fact, as many as one-sixth of the families were polygamous at the time. The HBC redistributed the land to monogamous families, leaving numerous women and children, who had been the second and third wives and offspring of hunters, dependent.

James Bay Natives were now being controlled by economic arrangements that primarily benefited the HBC; they were assigned land that was previously defined, their family structure was altered, and their hunting habits were controlled. Finally, the HBC even sought to control the marriages of Natives at the posts-by requiring them to receive the postmaster's permission to marry. This provided economic benefits for the Company by creating fewer dependents. In addition, hunters had to leave 10% of their earnings as a security deposit, in case of death.

The War of 1812 marked a period of considerable change for First Nations citizens. After this war, Canada was no longer threatened by the United States, leading to a large migration of British in search of the promised agricultural land. The population in Canada increased from 95,000 to 952,000 in the decade from 1841 to 1851 (Janigan, 1992). Consequently, Natives were no longer a majority and were no longer needed for military or economic purposes. They quickly lost their power while the Canadian government proceeded in its attempt to assimilate them.

During the next century, many new laws were created by the government in the hope of assimilating Natives. In 1857, Canada gave the right to vote and 20 hectares of land to Natives who were debt-free, educated, and of good moral character. In exchange,

Natives had to relinquish their aboriginal status. In 1869, federal bureaucrats were given the power to remove traditional Indian leaders from their positions for what the bureaucrats deemed as dishonesty, intemperance, or immorality. The same statute stipulated that Indian women who married non-Indians lost their status. The federal representatives replaced the traditional Native leaders with elected band councils. Those First Nations citizens who had agricultural products to sell required permits to do so; they also needed permits to leave the reserves in western Canada. Natives were not allowed to wear traditional dress off reserves. According to the Royal Proclamation of 1763, First Nations citizens could not mortgage their lands for capital to finance economic projects; they could only cede their lands to the Crown. From 1894 to the 1960s, Natives were forced to send their children to schools run by missionaries (the effects of this law on Natives are discussed in a later section). Until 1976, according to the first Indian Act, Natives lost their status if they practiced medicine, law, or entered the ministry.

To summarize and place this history in a sociological context, peripheral countries or regions are primarily viewed as exporters of raw materials. Whether the products are agricultural or mineral, these regions are exploited for the benefit of others. In the case of the James Bay area, the land was stripped of its animals to benefit the Europeans. In an analogous fashion, the Cree were stripped of their status, of their organizational process, and of their language, to name but a few of their losses.

The changes that the James Bay Cree experienced from the predependent era to after the colonizing period were tremendous. From the time the HBC first established trading posts, the lives of the Cree would never be the same. As their hunting patterns were altered by the HBC's policies, they began relying more on the posts and less on their previous hunting activities. Some argue that these changes are part of a natural evolution, that First Nations citizens in Canada could not continue to live in "teepees" year-round while sustaining themselves by hunting (as with most First Nations citizens around the world). Nevertheless, these changes would not have occurred so quickly without this process of colonialization, even though contact with the outside world was inevitable. The primary problem with these changes was that they made the James Bay area a periphery, and, by doing so, made its residents dependent on the "center." The actions of the HBC, the missionaries, and the government made the Cree dependent by removing their self-sufficiency. Both the HBC and the federal government found itself with more dependents after the implementation of new policy. Peripheral areas and countries are created by the core, not by the members of the periphery, and they are not a natural process of development.

TIER 2

The Dependent Theory

The previous section outlined how the James Bay area became a dependent periphery. It is important to have an understanding of the dependency theory when utilizing this concept to explain particular ailments in society. The concept of dependence has traditionally been employed when discussing the existing relationship between industrialized and underdeveloped countries. Dependency theory maintains that underdevelopment in the periphery is caused by obstacles placed by economic and political external structures, that is, those imposed by the center.

Before venturing further, it is interesting to note the origin of this theory. Hall (1981) describes the emergence of the dependency theory as one that was created by Native scholars in semiperipheral areas. It was not recognized until it was first denied and “reinvented” by the scholars in the center, who labeled it a world-system theory and re-exported it to its point of origin.

Dependency theorists use the terms center and periphery to describe the developed and the underdeveloped, respectively, or to be more precise, the controller and the dependent. Interchangeable terms for the center are core and metropole; the periphery is also called satellite and hinterland. Since this theory was initially introduced to explain the differences between the industrialized and the nonindustrialized countries, they are often respectively grouped as North and South.

Dependency theory has been criticized for not examining the development of Third World countries independently of the development of the center or North. Dependency theorists (Dos Santos, 1973; Frank, 1973), viewing the world as a “single system,” disagree with this criticism. They believe that one must look at how the underdeveloped countries were “inserted” into the world system and study how their historical positions and development were different from that of the North. Dependency theory was, in fact, created in response to imperialistic theories.

Dependency occurs when the economies of one group of countries are subjected to the development and expansion of other economies (DosSantos, 1973). Furthermore, this dependency will alter the internal structures of underdeveloped countries. This is a good definition of dependency, because it takes into consideration both the internal and the external factors of dependency and recognizes the existence of interdependent relationships (between the North and the South). It states that the relationship is dependent when the dominant countries expand and are self-sustaining, while the dependent countries can only expand as a reflection of the dominant ones (Roxborough, 1983).

There is a direct relationship between the level of “underdevelopment” and dependency in countries (Bromley & Bromley, 1988). The more a country relies on foreign investment, political decisions, resources, and technology, the fewer important changes a country can make without the approval of outsiders, hence the increase in dependency. Even though there are several different lines of thought in the dependency paradigm, most theorists agree that currently underdeveloped countries were not always at this stage. Underdevelopment, rather, is a state that arose after contact with imperialist nations.

There is a clear distinction to be made between the terms underdeveloped and undeveloped. Development occurs in undeveloped countries when self-reliance is maintained during the process. Undeveloped countries have, perhaps, easier access to development because they are not controlled by outside economic and political powers. Underdeveloped countries, on the other hand, are dependent without self-reliance and in need of foreign investment and tech

There is a clear distinction to be made between the terms underdeveloped and undeveloped. Development occurs in undeveloped countries when self-reliance is maintained during the process. Undeveloped countries have, perhaps, easier access to development because they are not controlled by outside economic and political powers. Underdeveloped countries, on the other hand, are dependent without self-reliance and in need of foreign investment and technology. Therefore, countries that are undeveloped can

have access to development; their regions have fewer problems with social and economic inequalities and, thus, have a stronger balance. (Examples of this movement from undeveloped to developed are the United States and Britain; meanwhile, countries such as Trinidad and Haiti went from undeveloped to underdeveloped [Allahar, 1995].) For Bromley and Bromley (1988), self-reliance is the key indicator to determine whether a country or region is underdeveloped or undeveloped. They state that the simplest way to determine whether a region is underdeveloped is to examine its gross national product. Underdevelopment leads to extreme poverty and no growth; therefore, the poorest countries or regions within countries are the most underdeveloped.

The center and periphery theory states, in general, that the reason one region is developed is that another is underdeveloped (Sacouman, 1981). Furthermore, when using the center and periphery theory, it is important to understand how these regions were formed. Roxborough (1983) believes that such regions were created when societies changed from feudalism to capitalism. Three major changes took place with this transition: (1) conflict between landowners and peasants, (2) urbanization, and (3) the evolution of centralized states. He explains that for this chain of events to occur, there had to be a rapid increase in capital. Two methods have been employed to increase the capital in the center: the first was to strip the wealth of the peripheries by colonialists, the second was to confiscate land held by peasants and the Church. These methods of “freeing” capital also created a landless class.

Resources are exported from the peripheral countries or regions to where they are processed into finished products. They are then returned to their point of origin with an inflated price tag. Thus, capital is accumulated in the center, which benefits not only from the profits but also from the jobs created by the manufacturing industry. Employed workers of the center generally have more money to spend, hence the development for a service industry. Dependence theorists see this economic “rape” of a country’s wealth as directly related to its continued dependence and backwardness. The peripheral regions become dependent because they neglect their internal markets, whereby most of their structures are developed for export. Part of their dependence stems from the fact that they have tailored “their economies to meet the needs of the advanced ones” (Allahar, 1989, p. 90).

Clement (1980), Matthews (1982) and Veltmeyer (1978) have used the dependency theory to explain economic and social regional differences within Canada. They claim that Canada became more dependent on the United States as it detached itself from Britain and traded more with its southern neighbor. This increase in dependence accentuated the regional disparities. This occurred because the “regional economies are tied to national economies and national ones to international ones,” thus creating a chain reaction (Allahar, 1989, p. 90).

As discussed earlier, in the context of peripheral and central countries in the world, the South (e.g., Central and South America) had supplied inexpensive raw materials, while many countries in the North (e.g., United States and Canada) utilized these raw materials to manufacture final products. Because of this division, only the North directly and indirectly profited from the raw resources. As Canada is divided into an industrial region and a hinterland, Clement (1980) believes that this process has occurred in Canada as well (only here the center is southern and the peripheral regions tend to be northern). Industrial Canada can be found between Windsor, Ontario, and Montreal, Quebec. Even though there are other industrial pockets across the country, there are some regions that are clearly “underdeveloped,” for example, areas of the Atlantic provinces and much of

the North. These regions have wealth, but this wealth is primarily made up of natural resources as opposed to financial institutions and production plants. Since the main source of income is from raw materials, wages and employment rates remain low in these regions. The consequence of this underdevelopment is that infrastructures are substandard, social development is of low priority (Matthews, 1982), and “life chances” for those residing in the core are much better.

In conclusion, dependency theory essentially maintains that developed countries are such because there are underdeveloped nations, that the economy of an underdeveloped country is dependent on the center, and that consequences of underdevelopment include neglected social development and lack of social infrastructure. Applying dependency theory, the following section discusses concrete examples of economic and political dependence experienced by First Nations citizens, in particular the James Bay Cree.

Economic Dependency. One way of determining the degree of dependence of First Nations citizens is to examine the origin of their major sources of income. In 1986, 50% of registered Indians residing on-reserve reported that their major source of income was government transfer payments, whereas only 20% of the general population reported the same major source (Quantitative Analysis and Socio-Demographic Research, 1989, p. 27). Only 55% of registered Indians residing off-reserve reported employment income as their major source of income, compared to 70% of the general population (Quantitative Analysis and Socio-Demographic Research, 1989, p. 27). Also in 1986, registered Indian women earned two-thirds of the income earned by registered Indian men (Indian and Northern Affairs Canada, 1990, p. 30). It is also important to realize that a given amount of income received does not have the same buying power in isolated communities (e.g., northern, as compared with southern reserves) because of the inflated price of goods.

As mentioned earlier, one of the consequences of living in a peripheral region is improper infrastructure; poor housing conditions are an example. Statistics Canada defines a crowded dwelling as a home that has more than one occupant per room. In 1986, 37% of registered Indians living on-reserve in Quebec reported crowded dwellings, compared to 4% of the non- Native population residing near reserves (Indian and Northern Affairs Canada, 1990, p. 20). Registered Indians living off-reserve in Canada were approximately 18 times more likely to live in crowded dwellings than the non-Native population (Indian and Northern Affairs Canada, 1990, p. 29). Some may argue that First Nations citizens choose to live this way, that it is part of their culture to live with their extended families and friends. However, it is not culture but poor income that determines if they will have heating systems in their homes.

In 1986, 38% of registered Indian dwellings located on-reserve in Canada reported not having a central heating system (Indian and Northern Affairs Canada, 1990, p. 31). A central heating system is defined by Statistics Canada as a steam or hot-water furnace, forced air, or installed electric heating system. Registered Indians living off-reserve were almost twice as likely to report having a home without a central heating system than the general population, while registered Indians in Quebec were more than three times as likely to report the absence of central heating (Indian and Northern Affairs Canada, 1990, p. 31). Overcrowding and/or inadequate heating systems increase the occurrence of fire, and where there are substandard firefighting facilities—as in remote northern areas—these fires often lead to death.

Political Dependency. The center has also hampered the development of First Nations citizens by controlling their political structures. In the late 1800s, the Canadian government began replacing traditional Native leaders with elected band councils. In so doing, the center removed the existing political structures, which were already quite sophisticated. It was easier for colonizers to standardize all peripheral governments according to one model, thus diminishing the task of dealing with several different nations, each with its own culture and political idiosyncrasies. The “whites” were seeking to assimilate and “civilize” the Natives. They forced municipal-like political structures onto First Nations bands, causing the loss of culture and power.

The policies of the HBC and the laws governing the Cree created dependency. The James Bay region was exploited for its natural resources; hence, their economy was tailored to the needs of the South. The laws prevented them from adapting their social infrastructure in light of the sudden changes. This state of imposed dependence led to a cultural genocide by the dominant society through residential schools, and alcoholism among the Natives, just as colonialism led to dependency (Figure 1). The trauma was not only continued but it also became more prominent. The next section discusses the emergence and effects of residential schools and alcoholism in First Nations communities.

TIER 3

Residential Schools

Much of the family violence, alcoholism, and suicidal behavior among First Nations citizens has originated either directly or indirectly from the abuse inflicted on students in the residential schools. York (1990) reports Mandy Brown (a social worker on the Lytton reserve) to say that these are problems that are transmitted from generation to generation, like an inherited disease. She repeatedly tried to treat community members for these problems without any success. Examining the family trees of the victims, she finally noticed one connecting factor: St. George’s School, an Indian residential school near the reserve. In December 1987, the former dormitory supervisor, Derek Clarke, pleaded guilty to numerous counts of buggery and indecent assault. Judge William Blair said that Clarke had been responsible for as many as 700 incidents of sexual assault. In this instance, an entire community was deeply affected by the sexual abuse that occurred at the residential school. This scenario is not unique to the Lytton reserve. The horror stories of child abuse and sexual assault in these schools are still coming to light.

Residential schools were founded and operated by Protestant and Catholic missionaries. As mentioned earlier, Native children were sent away from their families and communities to these institutions across Canada from the late 19th century until the 1960s. First Nations citizens in western Canada were forced to send their children to schools run by missionaries as early as 1894.

Many believe that the placement of children, often by force, in isolated residential schools was in fact cultural genocide. These schools were more often than not administered by a practicing religious group, so that the students were forced to practice a religion that was not their own. Native children were forbidden to speak their mother tongue or to practice ceremonial rituals. These children became caught between two

cultures: “Whites” tried to assimilate them into a society that was not ready to receive them, while taking away all the skills necessary to function in their own society. They never received the informal education that was required to learn their Native language, religion, and skills such as hunting and gathering.

Residential schools did not affect just the students who attended them. At least two subsequent generations were also “lost.” The children of these students became victims of abuse as their parents became abusers because of the residential school experience. Since their parents had lost much of their culture, the small amount of informal education these children could receive came from other relations who did not attend the schools. The loss of culture that occurred in the decades of the residential schools was enormous. At least four generations of First Nations citizens attended these schools. The lasting effects of residential schools have been so severe that psychologists deemed it necessary to coin the term “residential-school syndrome.” The cycle of grief associated with a loss of culture is as intense as the loss of a loved one (York, 1990). Genocide on the basis of ethnicity and religion has a traumatic effect on the families concerned (Rousseau & Drapeau, 1998).

Alcoholism/Substance Abuse

Substance abuse, especially alcoholism, is a problem often associated with First Nations citizens. There are high levels of alcoholism in many Native communities. According to several Native leaders, alcohol is the number-one community problem (York, 1990). The problem with alcohol did not become obvious until after World War II, when the federal government began establishing military bases in remote areas of the country. These bases were most often near reserves and introduced social programs, such as housing projects and welfare. This increased flow of money into reserves and allowed Natives to purchase readily available goods outside the reserve for the first time. Residential schools were also beginning to have their intergenerational effect on the communities during this time. The frustration and pain of losing one’s identity and of being caught between two cultures was transmitted from one generation to the next. The list of causes that pushed First Nations citizens toward alcoholism is endless and continues to grow. Many Natives may have started drinking after World War II for some of the reasons listed earlier. Some Natives are drinking today because the habit has been passed on from one generation to the next.

Alcoholism is also linked to the trauma described in Tier 4. The far-reaching effects of alcohol abuse are as enormous as the causes of alcoholism in First Nations communities. Binge drinking is very common among First Nations Citizens. Drinking is implicated in many of the accidental deaths of Natives. Many congenital defects are caused by the consumption of alcohol by pregnant women. Recently, as many as 25% of the children born on a British Columbian reserve had birth defects caused by fetal alcohol syndrome (York, 1990, p. 195). York quotes Bea Shawanda’s (of the National Native Association of Treatment Directors) comment that violence and alcoholism are reactions by her people to a loss of language and culture, substituting, in effect, for grieving.

Another serious problem faced by First Nations bands is gasoline sniffing. It was first noticed among Natives in the early 1970s and has since become more popular. In 1975, 62% of Cree and Inuit youths at Great Whale River in northern Quebec revealed that they had sniffed gasoline at least once in the last 6 months (York, 1990, p. 10). Some

people were said to use gasoline to calm their infants. The greatest problem with this kind of substance abuse is finding ways to control access to gasoline. In the case of alcohol, many reserves have set up road-blocks and search incoming airplanes in order to confiscate all forms of liquor. Gasoline, on the other hand, is necessary for operating boats, trucks, and skidoos. Medical experts assert that gasoline sniffing is the most dangerous addiction in the world; children may become addicted after only a single inhalation, and it causes severe physical damage to the nervous system (York, 1990). The effects of sniffing are similar to those of LSD; it creates a state of euphoria and altered consciousness.

One of the effects of gasoline sniffing is extreme violence. Police and court officials have claimed that 60% to 70% of juvenile crimes involved gasoline sniffing (York, 1990, p. 10). The problem is so serious that the death it can cause has been given a name, "sudden sniffing death syndrome." Chemicals in the inhalant cause an irregular heartbeat. When the sniffer attempts to fight or run, increased adrenalin causes the heartbeat to become more irregular and uncontrollable, resulting in heart failure and death.

Many precautions have been attempted in order to stop the sniffing addiction among First Nation citizens. The Hudson Bay store stopped selling glue, wood filler, nail-polish remover, felt-tip markers, typewriter correction fluid, and aerosol sprays in the North. Some bands have imposed curfews and "gas patrols." Patrollers take down the names of children who are caught sniffing and provide a copy to the nursing station and the band council. But gasoline sniffing is not illegal; therefore, the gas patrols are quite powerless. Some children start sniffing as early as 4 years old, when they see their brothers and sisters doing it.

York (1990) reports Dr. Fomazzari's (a neurologist at the Addiction Research Foundation in Toronto and an expert on inhalant abuse) observation that gasoline sniffing predominantly afflicts members of minority groups. Many minorities, such as the First Nations citizens of Australia and the United States, Hispanics, children of migrant workers, and illegal aliens, have been found to be inhalant abusers. Through complete or attempted assimilation, the dominant culture has destroyed the traditional economy and social organization of these groups. The dependent members of these minority groups adopt self-destructive behaviors, such as gasoline sniffing and alcoholism, because their identity has been lost and their traditional way of life has been destroyed.

Alcoholism is a more recent threat to the Inuit, who only came into contact with the substance on a regular basis in the mid-1960s. This coincided with the implementation of the Northern Rental Housing Program and the introduction of public schools. Their nomadic lifestyle was shifted to that of a sedentary village society. Since villages were first inhabited by people from different "tribal" backgrounds from a large geographic area, there was initially no real sense of community (O'Neil, 1984). Although the problem of alcoholism is more recent in the farthest points of the Canadian North, the causes and consequences (loss and separation) remain the same.

As indicated in Figure 1, the social problems of First Nations citizens are interrelated. To give a specific example, alcohol was said always to be involved in domestic fights by 44% of respondents in the Ontario Native Women's Association survey (1989), while 37% stated that it was often present in incidents of family violence (p. 22). In total, 78% of respondents said that alcoholism was a main cause of domestic violence. Alcohol abuse has been found to increase the risk of car accidents, domestic

violence, and other traumatic circumstances, and this in turn increases the risk of PTSD (Manson, 1997).

The following section discusses the items listed in the Tier 4 of Figure 1: family violence, child abuse, sexual abuse, suicide, and accidental deaths.

TIER 4

Suicide, sexual abuse, alcoholism, and family violence are among the recognized effects of trauma experienced by First Nations citizens (Manson *et al.*, 1996). This chapter maintains that items in Tier 4 of Figure 1 constitute not only the effects of trauma, but also that they are themselves traumatic events, capable of creating yet more trauma. This follows Kirmayer's (1996) contention that the onset of PTSD is not only caused by a catastrophic stress, but that it also may emerge as a consequence of the accumulation and/or continuation of milder stressors.

Therefore, once we reach Tier 4, its items can be classified as traumatic events that in themselves are significant stressors that can lead to PTSD. The following briefly discusses some thoughts in the trauma literature regarding child and sexual abuse, family violence, accidental deaths, and cultural bereavement.

Child Abuse/Sexual Abuse

There are countless examples of child abuse as it relates to residential schools and other institutions, as demonstrated in the section on residential schools. However, rates of abuse within families are more sensitive in nature and less readily available. This is a problem that is of significance but is usually dealt with in an ethnographic manner (e.g., Martens, 1988).

Child abuse and sexual abuse are events that have been deemed to be traumatic enough to initiate symptoms of PTSD. As demonstrated by the measures used to diagnose this disorder in teens, these primarily focus on the trauma of sexual abuse. Kirmayer (1995) indicated that adults who were victims of childhood abuse are often initially unaware of their traumatic experiences as memories. Moreover, these adults will often be diagnosed with dissociative disorders. Their trauma manifests itself through symptoms such as numbing, substance abuse, emotional and physical pain, changes of identity, and lapses of memory.

Family Violence/Accidental Deaths

In the 1986 census, Statistics Canada reported that accidental death rates for registered Indians on- and off-reserve had decreased since the previous census but were still higher than the national average (Indian and Northern Affairs Canada, 1990). It was also reported that First Nations women in Canada were four times more likely than non-Native women to die as a result of accidents or violence. The Ontario Native Women's Association (1989) reported that 84% of respondents were aware of family violence in their community (p. 3). Furthermore, 24% reported personally knowing of family violence that has led to death, primarily of women. Statistics are readily available in the

areas of suicide, family violence, and accidental deaths, but the important point to remember here is not the great number of incidents but the link between the items in Tiers 2, 3, and 4. Prior to dependence and colonialism, family violence and alcoholism were not prevalent (Martens, 1988). Furthermore, as with sexual abuse and child abuse, family violence and accidental deaths are events that have been found to be traumatic, as discussed earlier, and may lead to PTSD.

Cultural Bereavement

In the trauma literature, the loss of one's culture constitutes a traumatic event that often leads to anxiety disorders. PTSD is quite common among refugee groups. The symptoms of these disorders, in these cases, are best understood as cultural bereavement. The notion of cultural bereavement must have a place in research and clinical practice, because it is through narrative traditions, which are transmitted through participation in communal life, that people come to value themselves (Kirmayer, 1995). Hence, the loss of such a narrative would lead to cultural bereavement.

First Nations citizens are then caught in a vicious cycle of continuous exposure to traumatic events. As is the case with most vicious cycles, it is difficult to break free. However, the answers are most likely to be found in the removal of colonialism and the resolution of dependency. If efforts are concentrated only on responding to the symptoms in the outer tiers, without solving what created the problems to begin with, that is, the effects of colonialism and dependency, then the cycle will only continue. The following section illustrates some ideas regarding solutions to the cycle of trauma among First Nations citizens.

SOLUTIONS

From a Psychological Point of View

In order to truly understand anxiety disorders, one should examine the factors that influence their intrapsychic and interpersonal mechanisms, along with the cognitive and physiological systems (Kirmayer, Young, & Hayton, 1995). Hence, situations, roles, cultural practices, and social meanings must be examined to fully comprehend such disorders. Behavior varies from culture to culture. These differences may either contribute to overdiagnosing particular disorders or masking them in various populations. Consider, for example, the custom of women rarely leaving the home in particular countries, and the accompaniment of the women when they do leave, and its relationship to agoraphobia (Kirmayer *et al.*, 1995). Manson *et al.* (1996) also stress the importance of cultural sensitivity when measuring PTSD in American Indians; for example, who is to say whether behaviors that seem to an outsider as lacking in emotion can be classified as psychic numbing, when these may express traditional stoicism and limited disclosure? With respect to diagnosing depression, Neligh (1988) noticed that social service providers have avoided labeling American Indian adolescents as depressive because of uncertainty about potential stigma in this cultural context.

Kirmayer *et al.* (1995) summarize that culture should be taken into account when treating individuals. They state that a professional needs to be culturally sensitive toward his or her patient to fully understand reactions and behaviors that are dictated by sociocultural norms. Furthermore, the individual attempting to give aid must factor in the issues of gender, race, power, and forces of oppression to facilitate a successful recovery.

Being culturally sensitive may mean adopting different ways of healing, or rediscovering traditional ways, such as “healing ceremonies” (Manson, 1997; Manson *et al.*, 1996). It also means offering appropriate services. For example, the “patchwork” solution to domestic violence, favored by the “central” society in Canada, has been shelters. Shelters for First Nations women are not only limited in number but also in cultural sensitivity. Furthermore, most victims of family violence must seek help in “nonaboriginal” shelters, which are, primarily, located in urban areas, far removed from the victim's community and family (Ontario Native Women's Association, 1989).

From a Sociological Point of View

The negative effects of the vicious cycle of traumatic events witnessed by First Nations citizens cannot be resolved without substantially diminishing their economic, social, and political dependence. A change in government policies is required in order to have any positive effects on the level of dependency of First Nations citizens. Meanwhile, there are smaller steps re- searchers should remain aware of when dealing with this complex issue. From a sociological perspective, one must be aware of the motives and the potential negative effects of public health surveillance systems. Involving Native researchers in trauma studies within their communities may prevent some of the negative effects of health studies. The knowledge generated about certain populations may reinforce the image of disorganized and sick communities, hence forging unequal power relationships and justifying paternalistic and dependent roles (O'Neil, 1994).

Some argue that the answer to the problem of underdevelopment in a peripheral region is economic growth. However, one must be careful, because there is a great difference between economic growth and economic development (Frideres, 1988). In communities that have experienced only economic growth, social problems have remained. For example, royalties from oil do not provide employment, education, and social services unless these funds are used for economic development. One needs power to create change, and power is out of reach when dependent.

Community health development needs to be founded on the basis of harmony and respect for all realms affecting aboriginal life (O'Neil, 1994). Therefore, communal health and policies concerning self-government, environmental protection, and socioeconomic management must be developed simultaneously. However, in the search to make First Nations peoples “healthier,” it is important not to reconstruct their memory in terms of victimhood. This will only serve to alienate families, and, more importantly, oversimplify the problems that are, in fact, caused by a web of complex events. Ultimately, this would only institutionalize the notion of victim and remove power from those it aims to help.

Due to their dependent state, peripheries have little power to create change. For example, in 1989, the village of Chisasibi set up a roadblock on the road leading into the village, where alcohol was confiscated. Soon after, the Surete de Quebec notified the Chief of Chisasibi, Violet Pachanos, that their actions were illegal, because the road was

on Category II land and not within the jurisdiction of the village. However, by returning more control to Native communities, they become free to introduce laws that may help them combat particularly harmful behavior, such as alcoholism. The first documented initiative toward curbing the consumption of alcohol occurred in Frobisher Bay, when it closed its liquor store in 1976. Since then, two Inuit communities have implemented, for their problem drinkers, systems of interdiction; two communities have instituted alcohol rationing systems; two have closed their liquor stores; and, a total of 10 communities have hired counselors. Since 1978, eight out of 24 villages with populations between 200 and 1,000 have prohibited alcohol completely (O'Neil, 1984; p. 340). Prohibition has decreased both substance and illegal substance abuse in these communities. Since prohibition, many observers have noted the low incidence of alcohol-related problems in these communities in comparison with other Northern communities without forms of prohibition (O'Neil, 1984). One of the main reasons why this ban has had these positive effects is that it is locally implemented. Villages are given the prohibition option by the government of the territory, and its implementation is negotiated by local institutions. Returning control to Native communities also promotes the rejuvenation of their culture. An example of such rejuvenation is the reestablishment of sweat lodges and elders.

CONCLUSION: How Is This Trauma Deemed Intergenerational?

The trauma described in this chapter is not intergenerational in the same way as that experienced by war survivors. In the case of war, the traumatic experience itself is experienced by the first generation only. This theoretically alters the behavior of the victim and consequently alters the behaviors of family members. In the case of First Nation citizens, several generations have been continuously exposed to the traumatic experiences of sexual abuse, family violence, child abuse, accidental death, and suicide. The trauma here is intergenerational in the sense that economic, social, and political dependence—the effects of colonialism—are intergenerational. As with the example of the residential schools discussed earlier, the sexual and physical abuse experienced by their pupils have led entire communities to become inundated with alcoholism and the aforementioned abuses.

The effects of trauma can also be transmitted to succeeding generations through culture. The ways in which cultures encourage or discourage people to deal with their negative emotions will, to some extent, determine the intergenerational effects of trauma. Encouragement to suppress emotional responses and limit the disclosure of events, viewed in particular cultures as a way to protect others and oneself, may nonetheless be harmful (Kirmayer *et al.*, 1995). An example of the effects of silence is provided by Rousseau and Drapeau (1998). They found that among Southeast Asians, a “return of the repressed” can occur through indirect allusions to past traumatic events. The silence regarding these events was originally intended to protect the children; however, allusions to rape appear to inflate the anxiety and depressive symptoms in girls who are going through puberty. When studying the effects of intergenerational trauma, one should examine the cultural rituals of communication and topics of conversation that are considered taboo. There is a social and cultural context to determine how a life story, or a narrative, will be registered and recalled (Kirmayer, 1995). How these memories are interpreted and encoded when registered is governed by cultural models that also dictate what is socially acceptable to be spoken of and acknowledged.

One should also remember that First Nations citizens suffer not only from the effects of dependency and colonialism, but also from being considered by many as second-class citizens. Racism plays a major role in elevated rates of anxiety disorders among Natives. Kirmayer *et al.* (1995) indicate that higher rates of phobia in particular minority groups, compared to non-minority groups, when sociodemographic variables were controlled, could be attributed to the fact that minorities experience more stressful events and suffer from racism, and from being labeled as members of a minority group.

It is important to note that despite having divided the items discussed in this chapter into four tiers, these traumatic events, among others, are all interrelated and have a cumulative effect on the individuals experiencing them. It is because First Nations citizens have experienced so many of these events in their lifetime that such a high percentage of their population suffers from PTSD and other anxiety disorders.

Finally, cultural sensitivity on the part of the professional is mandatory if the cycle of trauma is to be stopped. To prevent further intergenerational transmission, perhaps the most important goal should be to return political, economic, and social power to First Nations bands and to end this destructive dependence.

REFERENCES

- Allahar, A. L. (1989). *Sociology and the periphery: Theories and issues*. Toronto: Garamond Press.
- Allahar, A. L. (1995). *Sociology and the periphery: Theories and issues* (2nd ed). Toronto: Garamond Press.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed. rev.). Washington, DC: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Amin, S. (1989). *Lafayette du developpement en Afrique et dans le Tiers-Monde*. Paris: l'Harmattan.
- Beaulieu, D. (1984). *The Crees and Naskapes of Quebec: Their socio-economic conditions*. Direction des Communications du Gouvernement du Quebec, Quebec, Quebec, Canada.
- Berger, T. R. (1985). *Liberte fragile: Droits de la personne et dissidence au Canada*. (1981). Ville de la Salle, Quebec: Editions Hurtubise.
- Blomstrom, M., & Hettne, B. (1984). *Development theory in transition: The dependency debate and beyond: Third World responses*. London: Zed Books.
- Brecher, I. (Ed.). (1989). *Human rights, development and foreign policy: Canadian perspectives*. Halifax, Nova Scotia: Institute for Research on Public Policy.
- Bromley, D. F. R., & Bromley, R. (1988). *South American development: A geographical introduction*. Cambridge, UK: Cambridge University Press.
- Cassidy, F. (1991). *Aboriginal self-determination*. Winnipeg: Oolichan Books and the Institute for Research on Public Policy.
- Cassidy, F., & Bish, R. L. (1990). *Indian Government its meaning in practice*. Halifax: Institute for Research on Public Policy.

- Chalk, F., & Jonassohn, K. (1990). *The history and sociology of genocide: Analyses and case studies*. London: Yale University Press.
- Chance, N. A. (1970). *Summary report: Developmental change among the Cree Indians of Quebec*. Ottawa: Rural Development Branch.
- Clement, W. (1980). "A political economy of regionalism in Canada." In J. Harp & J. R. Hafley (Eds.), *Structured inequality in Canada* (pp. 268-284). Toronto: Prentice-Hall.
- Clement, W. (1983). *Class, power and poverty*. Toronto: Matthew Publication.
- Cree Housing Corporation. (1980). Cree housing and infrastructure program: Five-year capital works program 1979-1984. Rupert House.
- Cumming, P. A., & Mickenberg, N.H. (Eds.). (1971). *Native Rights in Canada* (2nd ed.). Toronto: Indian-Eskimo Association of Canada in association with General Publishing.
- Darnell, F. (1983). "Indigenous cultural minorities: Concepts pertaining to their education." *The education of minority groups: An enquiry into problems and practices of fifteen countries*. Grower, Hampshire, UK: Organisation for Economic Co-operation and Development.
- Delage, D. (1989). "L'alliance franco-amerindienne 1660-1701." *Recherches Amerindiennes au Quebec*, 19(1), 3-15.
- Delage, D. (1991). *Le Pays renverse: Amerindiens et Europeens en Amerique du nord-est: 1600-1664*. Quebec: Boreal, Compact.
- Demmert, W. G. (1971). "An American Indian view on education for indigenous minorities." *The education of minority Groups: An enquiry into problems and practices of fifteen countries*. Grower, Hampshire, UK: Organization for Economic Co-operation and Development.
- Dos Santos, T. (1973). "The structure of dependence." In C. K. Wilber (Ed.), *The political economy of development and underdevelopment* (pp. 15-37). New York: Random House.
- Dwyer, A. (1992, February). "The trouble of Great Whale." *Equinox*, 61, 28-41.
- Francis, D., & Marantz, T. (1983). *Partners in furs: A history of the fur trade in eastern James Bay, 1600-1870*. Kingston & Montreal: McGill-Queen's University Press.
- Frank, G. A. (1973). *Sociology of development and underdevelopment of sociology*. London: Pluto Press.
- Frideres, J. S. (1988). *Native peoples in Canada: Contemporary conflicts*. Scarborough, Canada: Prentice-Hall.
- Gagné, M.A. (1994). *A Nation within a nation: Dependency and the Cree*. Montreal: Black Rose Books.
- Glewwe, P., & Vander Gaag, J. (1990). "Identifying the poor in developing countries: Do different definitions matter?" *World Development*, 18(6), 803-814.
- Hall, T. D. (1981). "Is historical sociology of peripheral regions peripheral?" *Studies in Political Economy: A Socialist Review: Rethinking Canadian Political Economy*, 6.
- Harrington, M. (1977). *The development of underdevelopment: Why poor nations stay poor*. New York: Simon & Schuster. Indian and Northern Affairs Canada. (1981). Supplementary I: Briefing notes on the James Bay health crisis and epidemic. Ottawa, Canada: Ministry of Supply and Services.

- Indian and Northern Affairs Canada. (1982). *James Bay and Northern Quebec Agreement implementation review*. Ottawa, Canada: Ministry of Supply and Services.
- Indian and Northern Affairs Canada. (1990). *Health of Indian women: Notes on socio-demographic conditions*. Ottawa, Canada: Ministry of Supply and Services.
- Janigan, M. (1992). "Lonely cries of distrust: Anger and pain fuel Native claims." *Macleans*, 105(11), 22-24.
- Kirmayer, L. J. (1995). *Landscapes of memory: Trauma, narrative and dissociation*. In P. Antze & M. Lambek (Eds.),
- The subject of memory (pp. 173-198). London: Routledge.
- Kirmayer, L. J. (1996). "Confusion of the senses: Implications of cultural variations in somatoform and dissociative disorders to PTSD." In A. J. Marsella, M. Friedman, E. Gerrity, & R. Scurfield (Eds.), *Ethnocultural aspects of post- traumatic stress disorders*. Washington, DC: American Psychiatric Press.
- Kirmayer, L. J., Young, A., & Hayton, B. C. (1995). The cultural context of anxiety disorders. *The psychiatric Clinics of North America*, 18(3), 503-521.
- Knight, R. (1968, March). "Ecological factors in changing economy and social organization among the Rupert House Cree." *Anthropology Papers National Museum of Canada*, No. 15, Ottawa: Department of the Secretary of State.
- Manson, S.M. (1997). "Cross-cultural and multiethnic assessment of trauma." In J.P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 267-290). New York: Guilford.
- Manson, S. M., Ackerson, L. M., Wiegman Dick, R., Baron, A. E., & Fleming, C. M. (1990). "Depressive symptoms among American Indian adolescents: Psychometric characteristics of the Center for Epidemiologic Studies Depression Scale (CES-D)." *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 2(3), 231-237.
- Manson, S.M., Beals, J., O'Neil, T., Piaseki, J., Bechtold, D., Keane, E., & Jones, M. (1996). "Wounded spirits, ailing hearts: PTSD and related disorders among American Indians. In A. J. Marsella, M. J. Friedman, E. T. Gerrity, & R. M. Scurfield (Eds.), *Ethnocultural aspects of posttraumatic stress disorder: Issues, research, and clinical applications* (pp. 225-284). Washington, DC: American Psychological Association.
- Manson, S. M., & Shore, J. H. (1981). "Psychiatric epidemiological research among American Indians and Alaska Natives: Methodological issues." *White Cloud Journal*, 2(2), 48-56.
- Martens, T. (1988). *The spirit weeps: Characteristics and dynamics of incest and child sexual abuse*. Edmonton, Canada: Nechi Institute.
- Matthews, R. (1982). Regional differences in Canada: Social versus economic interpretations. In D. Forcese & S. Richer (Eds.), *Social issues: Sociological views in Canada* (pp. 82-123). Toronto: Prentice-Hall.
- McCutcheon, S. (1991). *Electric rivers: The story of the James Bay Project*. Montreal: Black Rose Books.
- Mohawk Council of Akwesasne and Mohawk Council of Kahnawake. (1986). Declaration of intent on Mohawks self-government, self-determination. Quebec: St-Regis.
- Mohawk, J. (1990). *Indian economic development: The U.S. experience of an evolving Indian sovereignty*. Unpublished manuscript.

- Neligh, G. (1988). "Major mental disorders and behavior among American Indians and Alaska Natives." In S. M. Manson & N. G. Dinges (Eds.), *Behavioral health issues among American Indians and Alaska Natives: Explorations on the frontiers of the biobehavioral sciences* (pp. 116-159). Denver: University of Colorado Health Sciences Center.
- O'Neil, J. D. (1984). "Community control over health problems: Alcohol prohibition in a Canadian Inuit village." *Circumpolar Health*, 84, 340-343. Proceedings of the Sixth International Symposium on Circumpolar Health, edited by R. Fortune. Seattle: University of Washington Press.
- O'Neil, T. (1989). "Psychiatric investigations among American Indians and Alaska Natives: A critical review." *Culture Medicine and Psychiatry*, 13, 58-87.
- Ontario Native Womens Association. (1989). *Breaking free: A proposal for change to Aboriginal family violence*. Thunder Bay, Ontario: Author.
- Quantitative Analysis and Socio-Demographic Research. (1989). 1986 census highlights on registered Indians: Annotated tables. (Department of Indian and Northern Development) Minister of Supply and Services, Ottawa, Canada.
- Richardson, B. (1991). *Strangers devour the land*. Vancouver: Douglas & McIntyre.
- Roxborough, I. (1983). *Theories of underdevelopment*. London: Macmillan.
- Sacouman, J. R. (1981). The "peripheral" maritimes and Canada-wide Marxist political economy. *Studies in Political Economy: A Socialist Review: Rethinking Canadian Political Economy*, 6, 135-151.
- Tanner, A. (1979). "Bringing home animals: Religious ideology and mode of production of the Mistassini Cree hunters." *Social and Economics Studies* No. 23, Institute of Social and Economic Research, Memorial University of Newfoundland. London: C. Hurst.
- United Nations Development Program. (1990). *United Nations development program: World development annual report*. New York: UNDP.
- United Native Nations. (n.d.). *After the ink dries: Will promises made be promises kept: Concerning James Bay Agreement Alaska Settlement, proposed CODE agreement*. Vancouver, BC: Legal Services Society of British Columbia.
- Veltmeyer, H. (1978). The underdevelopment of Atlantic Canada. *Review of Radical Political Economics*, 0(2), 95-105.
- Wright, J. V. (1979). *Quebec prehistory*. National Museum of Man. Toronto: Van Nostrand Reinhold.
- York, G., & Pindera, L. (1991). *Peoples of the pines: The warriors and the legacy of Oka*. Toronto: Little, Brown.
- York, G. (1990). *The dispossessed: Life and death in Native Canada*. London: Vintage.
- Young, A. (1995). *Harmony of illusions*. Princeton, NJ: Princeton University Press.
- Originally published as: Gagné, Marie-Anik. "The Role of Dependency and Colonialism in Generating Trauma in First Nations Citizens." In: Yael Danieli (Ed.). *International handbook of Multigenerational Legacies of Trauma*, pp. 355-372. New York and London: Plenum Press, 1998.

On White Supremacy, Drugs, and Black Genocide

by Lorenzo Kom'boa Ervin

How the Capitalists Use Racism

The fate of the white working class has always been bound with the condition of Black workers. Going as far back as the American colonial period when Black labor was first imported into America, Black slaves and indentured servants have been oppressed right along with whites of the lower classes. But when European indentured servants joined with Blacks to rebel against their lot in the late 1600s, the propertied class decided to “free” them by giving them a special status as “whites” and thus a stake in the system of oppression.

Material incentives, as well as the newly elevated social status were used to ensure these lower classes’ allegiance. This invention of the “white race” and racial slavery of the Africans went hand-in-glove, and is how the upper classes maintained order during the period of slavery. Even poor whites had aspirations of doing better, since their social mobility was ensured by the new system. This social mobility, however, was on the backs of the African slaves, who were super-exploited.

But the die had been cast for the dual-tier form of labor, which exploited the African, but also trapped white labor. When they sought to organize unions or higher wages in the North or South, white laborers were slapped down by the rich, who used enslaved Black labor as their primary mode of production. The so-called “free” labor of the white worker did not stand a chance.

Although the Capitalists used the system of white skin privilege to great effect to divide the working class, the truth is that the Capitalists only favored white workers to use them against their own interests, not because there was true “white” class unity. The Capitalists didn’t want white labor united with Blacks against their rule and the system of exploitation of labor. The invention of the “white race” was a scam to facilitate this exploitation. White workers were bought off to allow their own wage slavery and the African’s super-exploitation; they struck a deal with the devil, which has hampered all efforts at class unity for the last four centuries.

The continual subjugation of the masses depends on competition and internal disunity. As long as discrimination exists, and racial or ethnic minorities are oppressed, the entire working class is oppressed and weakened. This is so because the Capitalist class is able to use racism to drive down the wages of individual segments of the working class by inciting racial antagonism and forcing a fight for jobs and services. This division is a development that ultimately undercuts the living standards of all workers. Moreover, by pitting whites against Blacks and other oppressed nationalities, the Capitalist class is able to prevent workers from uniting against their common class enemy. As long as workers are fighting each other, Capitalist class rule is secure.

If an effective resistance is to be mounted against the current racist offensive of the Capitalist class, the utmost solidarity between workers of all races is essential. The way to defeat the Capitalist strategy is for white workers to defend the democratic rights won by Blacks and other oppressed peoples after decades of hard struggle, and to fight to dismantle the system of white skin privilege. White workers should support and adopt the concrete demands of the Black movement, and should work to abolish the white identity entirely. These white workers should strive for multicultural unity, and should work with Black activists to build an anti-racist movement to challenge white supremacy. However, it is also very important to recognize the right of the Black movement to take an independent road in its own interests. That is what self-determination means.

Race and Class: the Combined Character of Black Oppression

Because of the way this nation has developed with the exploitation of African labor and the maintenance of an internal colony, Blacks and other non-white peoples are oppressed both as members of the working class and as a racial nationality. As Africans in America, they are a distinct people, hounded and segregated in U.S. society. By struggling for their human and civil rights, they ultimately come into confrontation with the entire Capitalist system, not just individual racists or regions of the country. The truth soon becomes apparent: Blacks cannot get their freedom under this system because, based on historically uneven competition, Capitalist exploitation is inherently racist.

At this juncture the movement can go into the direction of revolutionary social change, or limit itself to winning reforms and democratic rights within the structure of Capitalism. The potential is there for either. In fact, the weakness of the 1960s Civil rights movement was that it allied itself with the liberals in the Democratic Party and settled for civil rights protective legislation, instead of pushing for social revolution. This self-policing by the leaders of the movement is an abject lesson about why the new movement has to be self-activated and not dependent on personalities and politicians.

But if such a movement does become a social revolutionary movement, it must ultimately unite its forces with similar movements like Gays, Women, radical workers, and others who are in revolt against the system. For example, in the late 1960s the Black Liberation movement acted as a catalyst to spread revolutionary ideas and images, which brought forth the various opposition movements we see today. This is what we believe will happen again, although it is not enough to call for mindless “unity” as much of the white left does.

Because of the dual forms of oppression of non-white workers and the depth of social desperation it creates, Blacks workers will strike first, whether their potential allies are available to do so or not. This is self-determination and that is why it is necessary for oppressed workers to build independent movements to unite their own peoples first. This is why it is absolutely necessary for white workers to defend the democratic rights and gains of non-white workers. This self-activity of the oppressed masses, (such as the Black Liberation movement) is inherently revolutionary, and is an essential part of the social revolutionary process of the entire working class. These are not marginal issues; it cannot be downgraded or ignored by white workers if a revolutionary victory is to be had. It has to be recognized as a cardinal principle by all, that oppressed peoples have a right to self-determination, including the right to run their own organizations and liberation struggle. The victims of racism know best how to fight back against it.

The Drug Epidemic: A New Form of Black Genocide?

One of the worst forms of criminality is drug dealing, and it deserves same separate comments all its own. There is a negative drug subculture in the Black community that glorifies, or at least makes acceptable, drug use, even though it is killing us and destroying our community. In fact, every day we read of some junkie in our communities dying over an overdose of drugs, or of some street corner drug dealer dying from a shootout over a dispute or tip-off during a drug deal “gone sour.” The tragedy of the latter is that, these days, innocent victims — children or elderly people — have also been gunned down in the crossfire. The drug addict (the new term seems to be “crack-head”) is another tragic figure; he was a human being just like anyone else, but because of his oppressed social environment, sought drugs to ease the pain or to escape temporarily from the “concrete jungles” we are forced live in the urban ghettos of America.

With the introduction of crack, a more powerful derivative of cocaine, which made its appearance in the 1980s, even more problems and tragedies of this sort had developed — more addicts, more street gang killings, and more deterioration of our community. In the major urban areas there have almost always been drug uses, what is new is the depth of geographical penetration of crack to Black communities in all areas of the country. But the spread of crack is just a follow-up to massive government drug peddling that began at the end of the decade of the 1960s. The white House is the “rock house,” meaning the U.S. political administration is behind the whole drug trade. The U.S. government has actually been smuggling drugs into this country for many years aboard CIA and military planes to use as a chemical warfare weapon against Black America. These drugs were mostly heroin imported from the so-called “Golden Triangle” of Southeast Asia during the Vietnam War. But with the introduction of crack cocaine, there was no need to import drugs into the country at the same extent as before, because it could be chemically prepared in a mainland lab, and then distributed immediately. Crack created a whole new generation of drug clients and customers for the drug dealers; it was cheap and highly addictive.

Crack and other drugs are a huge source of profits for the government, and it keeps the Black community passive and politically indifferent. That is the main reason why we cannot depend upon the police force and or the government to stop the drug traffic or help the victims hooked on drugs. They are pushing the drugs to beat us down, on the one hand, but the State is also made more powerful because of the phony “war on drugs” which allows police state measures in Black and oppressed communities, and because of millions of dollars in government monetary appropriations made of “law enforcement” agencies, who supposedly are putting down the traffic in drugs. But they never go after the bankers or the big business pharmaceutical companies who fund the drug trade, just the street level dealers, who are usually poor Blacks.

Unemployment is another reason that drug trafficking is so prevalent in our communities. Poor people will desperately look for anything to make money with, even the very drugs that are destroying out communities. But if people have no jobs or income, drugs look very lucrative and the best way out of the situation. In fact, the drug economy has become the only income in many poor Black communities, and the only thing that some people perceive will lift them out of lives of desperate poverty. Clearly, decent jobs at a union wage are part of the answer to ending drug trafficking in our community, rather

than a dependence on police, courts and the State. The cops are not our friends or ally, and must be exposed for their part in protecting the trade, rather than suppressing it.

Only the community can stop drug trafficking, and it is our responsibility however you look at it. After all, those junkies are our brothers and sisters, mothers and fathers, neighbors and friends; they are no strangers. We must organize to save their lives and the life of our community. We must establish anti-dope programs in Black communities all over the country. We must expose and counter the government's role as pusher of dope, along with that of the police as protector of the drug trade. But also we must be prepared to help the drug victims with street counseling, street clinics (where they can clean-up and learn a trade and the sociopolitical reasons for drug use), propaganda against drug use, and other activities.

Junkies are the victims of the drug society, which thinks it's cool to use drugs. Children are some of the biggest victims of drug dealing, when they are tricked or forced (by economic necessity) into using or selling it. The users and dealers both are victims, but the dealers are something else than entirely innocent. Even though that Black on the corner selling dope bags is a victim himself of the economic and political system which makes him do it, dope dealers are a corrupt, dangerous breed who must be stopped. Many people have been killed or seriously injured for naively trying to oppose dope dealers, and make them leave their neighborhoods. Therefore, whereas the policy with junkies would be more benevolent and understanding, with dope dealers we must be cautious, and even ruthless when it is called for. We need to try to win them over first with an economic and political program to draw them away from the drug trade, but many of the dealers are so violence prone, especially the "big shots" (who are also protected by the cops) they must be opposed by both military and political means.

We are not advocating the summary murder of people, but we are saying if it takes death to bring about a change in the community, so be it! The issue of death is essentially an issue of who is doing the dying. It can be direct and exercised against the death merchant, or it can be indirect and exercised against our youth — if we let it. To be aware of a dangerous situation and not move to change it is to be as responsible for that dangerous situation as those who created it in the first place.

Listen, I don't want to simplify this problem by saying "just kill a few street-level dealers and that will end it." No, it won't, and we don't want to do that anyway! They are just poor people trying to survive this system, just pawns in the drug game whose lives don't matter to the big Capitalists or government. When they say so these street level dealers will be killed or imprisoned, but the drug-peddling system will go on. This is a sociopolitical problem, which can best be addressed by grassroots organizations. But it's the corporate and industrial backers of the drug trade (not just the common dealer) that not only must be exposed, but must be moved on. In addition to educational, agitation and other action, there must be military action by revolutionary cells.

The underground actions which we are asking people to move can be carried out by a relatively small group of dedicated people, a revolutionary cell of armed fighters, who have been trained in guerilla tactics. But even these small groups of people must have the support of the neighborhoods in order to function, otherwise people will not know it from another violent gang. Once this social cohesiveness exists among the community, then we can begin to put this proposal into action against the most violent, high-level drug dealers. We are addressing ourselves to what can be more or less be considered to be

guidelines for dealing with the problem on a neighborhood or community-wide level then at a national level:

1. Set up drug education classes in the community, for the youth especially, to expose the nature of the drug trade, who it hurts, and how the government, banks, and pharmaceutical companies are behind it all.
2. Exposure of the death merchants and their police protectors. (Photos, posters, fliers, newsletters, etc.)
3. Harassment of the dealers; i.e., threatening phone calls, knocking the drug “product,” have citizens marching inside their “place of business,” and other tactics.
4. Set up drug rehabilitation clinics so that junkies can be treated, can study the nature of their oppression, and can be won over to revolutionary politics. We must win people away from drug use and to the revolution.
5. Physical elimination of the dealer; intimidation driving him out a neighborhood or out of town, beatings, and assassination, where necessary.

Dope is death! We must fight dope addiction by any means necessary! Do all you can to help your people in the anti-dope war!

Excerpted from: Ervin, Lorenzo Kom'boa. *Anarchism and the Black Revolution*. Philadelphia: Monkeywrench Press/IWW, 1994. Available online at:
<https://theanarchistlibrary.org/library/lorenzo-kom-bo-ervin-anarchism-and-the-black-revolution>

3 Fog of War: Coca, Opiates, and Antidepressants

The Drugging of our Youth

by "D" from New Jersey Indymedia

Early on August 10, 2002, a 16-year old anarchist from northern New Jersey, Alex Asch, was sent across the country. He was enjoying a leisurely day at the Institute for Social Ecology (ISE) in Plainfield, Vermont, where he had spent his summer, when two "Juvenile Transport Officers" went in and demanded that ISE turn Alex over to them or else face a legal battle. Since Alex cared so much for institutions that are crucial to social revolution, he willingly submitted himself to their will, so that ISE would not have to be legally threatened, and was subsequently taken away to Turnabout Stillwater Academy, a youth "rehabilitation" camp in Salt Lake City.

At Turnabout Stillwater, Oppositional Defiance Disorder (ODD) is treated, a loosely defined behavioral diagnosis that labels "actively defying", "refusing to comply with rules," and "academic impairment" as being disordered. Ever Reviled Records, a collective that Asch had participated in, put out a statement saying that his parents sent him to school psychiatrists, who prescribed him sedative drugs, and put him in special programs, all against his will. The school psychiatrists said Asch had ODD. He went to the ISE to pursue his interests in political theories of social ecology, but his diagnosis of ODD followed him to Vermont, and led him to Utah, where he remains.

"I'll obviously be here for a tremendously long time," wrote Asch in a letter from February 2003. "I have only been outside once within the past 35 days now, yet I'm still in that beautiful environment berry picking."

An escalating level of clinical diagnoses and consequential drug treatment of the youth in the U.S. is not something that we always hear or read about, but it is drastically effecting people below the age of 18. Pharmaceutical drugs are increasingly being over-prescribed to youth in the treatment of psychological illnesses. Alex Asch is just one of thousands of teenagers and young people who have been subjected to the consequences of being diagnosed by an arbitrary "illness."

At least 500,000 children and teens in the U.S. are taking anti-depressants, according to McMan's Depression and Bipolar Web page. This number is increasing, as a number of reports have presented. "A 1999 study in the *Journal of the American Medical Association* notes that antidepressant use amongst preschoolers has doubled between 1991 and 1995," according to the web page. Food and Drug Administration (FDA) data reports that 3,000 prescriptions for Prozac had been written for children younger than age one.

There is some indication that Selective Serotonin Reuptake Inhibitors (SSRIs), or antidepressants, have a detrimental impact on treating emotional disorders in children. Some common names of SSRIs include Prozac, Zoloft, Paxil, and Luvox. An example of this can be found in the examination of cortisol, a brain chemical. A single 30mg dose of Prozac doubles the level of cortisol, and recent evidence has come out that cortisol produces brain damage, according to Dr. Ann Blake Tracy, Director of the International Coalition for Drug Awareness. In *The Next Generation Medical Guinea Pigs: Our Prozac, Zoloft, and Paxil Babies*, Tracy wrote, "This drastic increase in cortisol causes a multitude of serious physical reactions including impairment of linear growth, as well as impairing the development and regeneration of the liver, kidneys, muscles, etc." The possibility of brain damage and an impairment of growth are risks that children can be exposed to, if taking SSRIs.

In 1998, Tracy reported that there were one million children between the ages of six to 18 on SSRIs. The fact that children had been taking drugs that had been made for adults, was a cause for concern. This concern was placated on January 3, 2003, when the FDA approved the use of Prozac to treat children ages seven to 17 for major depressive disorder (depression) and obsessive-compulsive disorder (OCD). This is the first time that an SSRI has been approved to treat this age group, and represents an increasing level of prescription drug usage amongst youth in the U.S.

The FDA reported that the approval of Prozac for pediatric use was based on two placebo controlled clinical trials in depressed outpatients whose diagnoses corresponded to standard rating criteria. They claim that the drug produced a statistically significant effect on the "Childhood Depression Rating Scale R." There were no long term experiments on the use of Prozac to treat children, thus the effects may be harmful.

Rick Giombetti, of the International Coalition for Drug Awareness, said that the FDA does not test drugs it approves for medicinal use. All of the clinical trials that lead to the approval of drugs for commercial use in the U.S. are funded and directed by the companies who market and manufacture the drugs. He explains that, given that private drug companies rely on marketing drugs they have exclusive patents for, these companies do anything but long term drug testing in the trials they fund or that they do everything they can to conduct trials which favor the new drug.

In his article published in August 2001, entitled *Prozac Hangover*, Giombetti explained that drug companies market new drugs as scientific breakthroughs with few side effects. These kinds of advertising claims are made in light of a complete lack of long term testing of new drugs.

Additionally, according to FDA spokespersons, there have been more adverse reaction reports on Prozac than any other medical product. In October 1993, a total of 28,623 complaints of adverse side effects were filed with the FDA, including 1,885 suicide attempts and 1,341 deaths.

Something is wrong with this picture; people aren't even physically developed until their teenage years, yet toddlers are being treated for symptoms that could just be individual personality traits.

"Pharmaceutical corporations are slowly becoming as influential as oil, defense, and media corporations in state institutions," said Deicide, a friend of Alex's and member of Ever Reviled Records. "Do pharmaceutical corporations have the right to wield such absolute power over the political system and thusly dominant political culture? I think it

is also unfortunate that the subjects of this phenomenon are children, who are often not in an emotional, cognitive or political position to challenge its legitimacy.”

As of now, Turnabout Stillwater intends to end Alex Asch’s “treatment program” on June 28, 2004, when he is legally an adult. His only way of communicating to his friends in New Jersey is through censored letters. He was not allowed outside for over 70 days, and is currently being forced to take unknown pharmaceutical drugs.

“Alex is just one subject of a uniquely contemporary phenomenon,” said Deicide. “It is quite possible that America’s children are being drugged into a state of complacency by corporations that are aware that without such apathy and indifference, the public, especially the youth, would be more difficult to control.” Asch essentially feels the same way as Deicide about the interrelation of psychiatric treatment and pharmaceuticals in youth to the bigger picture.

“I am able to develop a perspective of this environment as a residential and domestic reflection of mass civilization and attempting to learn within thought or educate myself as much as possible and coming to an amazing understanding of hierarchy, hegemony, authoritarian ideology or enforcement, or the systematic enclosure that brings upon human tyranny within ecological alienation and environmental destruction,” wrote Asch in a letter from October 2002.

For more information on the pharmaceutical industries, check out:

International Coalition for Drug Awareness <http://www.drugawareness.org/>

“Prozac Hangover” by Rick Giombetti can be found at:

<https://la.indymedia.org/news/2001/08/9483.php>

Originally published online <http://newjersey.indymedia.org> and later in *Defenestrator* 23, (2003): 7.

The Downsides of Prozac

by Craig Lambert

Like many others, Elizabeth Wurtzel '89 and Lauren Slater, Ed. M. '89—the authors, respectively, of *Prozac Nation* (1994) and *Prozac Diary* (1998)—suffered “Prozac poop-out”: the drug's mood-altering effects wore off and depression returned. In fact, according to a 1995 study by associate professor of psychiatry Maurizio Fava, Prozac wears off within a year for about one-third of those who take it. “This is tolerance,” says clinical instructor in psychiatry and University Health Services physician Joseph Glenmullen, M.D. '84. His new book, *Prozac Backlash* (Simon & Schuster), documents not only tolerance, withdrawal syndromes, and drug dependency, but a panoply of dangers linked to “Prozac-like drugs”—selective serotonin reuptake inhibitors (SSRIs). “We now have unequivocal evidence from a wide range of side effects that Prozac-type drugs impair the normal functioning of the brain,” Glenmullen says.

SSRIs include Prozac, Zoloft, Paxil, Luvox, Celexa—trade names that invariably include an x or z for drugs that are best known as antidepressants. But “calling them that is misleading,” says Glenmullen, who notes that primary-care doctors, not psychiatrists, write 70 percent of SSRI prescriptions. SSRIs are now prescribed for anxiety, obsessions, substance abuse, chronic pain, shyness, even “to feel ‘better than well,’” Glenmullen says. “They’ve become all-purpose psychoanalgesics. People think they’ve got to keep up with the Joneses, pharmacologically—if everyone at your office is taking Zoloft to stay alert and work long hours, you’ve got to have it, too.”

Prozac sales surged in the wake of *Listening to Prozac*, the 1993 bestseller by psychiatrist Peter Kramer '70, M.D. '76, who coined the term “cosmetic psychopharmacology” and sang that with Prozac he had seen “patient after patient become...‘better than well.’ Prozac seemed to give social confidence to the habitually timid, to make the sensitive brash, to lend the introvert the social skills of a salesman.” Sales also broadened as pharmaceutical houses developed what some are now calling “a strategy of marketing diseases as an effective way of marketing drugs. It’s a trend toward pathologizing daily life,” Glenmullen says. He points to a psychiatric syndrome called “social phobia,” a very rare disorder that a therapist might encounter once or twice in a career—people so terrified of social contact that they may, for example, avoid going to restaurants for fear of being seen eating in public. “Over the last few years, psychiatrists have been inundated with drug-company mailings that cite ‘experts’ renaming ‘social phobia’ as ‘social-anxiety disorder,’” Glenmullen says. “The Food and Drug Administration [FDA] recently approved Paxil to treat social phobia. But the mass media report this to the public as a treatment for shyness!”

The drug panaceas, however, may be illusory. Rigorous studies have shown that the placebo effect accounts for most—at least 64 percent, and perhaps much more—of SSRIs’ benefits. Furthermore, in clinical trials, side effects often tip off research subjects that they are getting the active drug. Better-designed studies use placebos with side effects (like dry mouth), but no antidepressant properties. Under these conditions, Glenmullen writes, the “performance of the placebo climbs and the difference between the placebo and the antidepressant is virtually washed out.”

What is not washed out are the side effects, which include the potential for brain damage. A few years ago one of Glenmullen’s patients who was taking Prozac developed a tic—the

tongue darting in and out of the mouth—that persisted for months after the drug was discontinued. That sent Glenmullen to Countway Library. He found reports of tics and other neurological side effects, like drug-induced Parkinsonism, associated with SSRIs. “The tics include lip smacking, lip puckering, fishlike kissing motions, and pelvic thrusting,” Glenmullen says. “They are involuntary, disfiguring, and can be very noticeable—and may persist long after the drug is stopped. This is the dread side effect in psychiatry, and it can indicate brain damage. Such reactions are not rare. Neurologic agitation is estimated to occur in 10 to 25 percent of patients, and muscle spasms in 10 percent.”

The FDA mandates clinical trials for antidepressants that typically last only six weeks and primarily test the drug’s efficacy and short-term safety. “We lack systematic monitoring of long-term side effects,” Glenmullen says, noting that a former FDA head estimated that only 1 percent of long-term side effects comes to the agency’s attention. Glenmullen adds that such side effects of psychiatric drugs typically take three decades to gain a critical level of attention, as with the restlessness and involuntary twitching—tardive dyskinesia—associated with Thorazine and other major tranquilizers. “Those drugs were prescribed the way Prozac is now,” Glenmullen states. (To date, an estimated 30 million people have ingested SSRIs.)

Earlier generations of serotonin-targeting drugs like cocaine, amphetamines, diet pills, and Ecstasy “have been exhaustively studied in animals, and all have been shown to be neurotoxic to cells in the brain—for example, destroying nerve endings. But there’s very little comparable research on the SSRIs,” Glenmullen says. “To do animal research, you need tiny doses of the pure drug. Yet researchers say that each pharmaceutical company controls the supply of pure drug while it is under patent. To do studies under a company’s auspices means signing a contract that allows it to veto publication unilaterally.”

Hence, side effects show up in the massive field trial of the marketplace. “Repeated studies have shown that about 60 percent of patients have some form of sexual dysfunction—loss of libido, difficulty reaching orgasm, impotence—on SSRIs,” Glenmullen says. “But Eli Lilly’s official figure is 2 to 5 percent.” More ominously, the Prozac “lift” has lifted some into violent rampages, like that of the Louisville printing-press operator who in 1989 killed eight and wounded a dozen more with an AK-47 assault rifle just weeks after starting Prozac. Glenmullen has seen some of his own patients besieged by suicidal thoughts of “a particularly obsessive quality” after starting Prozac, and says that the Swedish and German equivalents of the Physician’s Desk Reference warn doctors of this potential side effect and provide guidelines for managing it.

For his part, Glenmullen has long prescribed Prozac and other SSRIs and continues to use them in specific cases. But he also suggests numerous treatment alternatives for anyone using or contemplating the use of such drugs—including psychotherapy, cognitive therapy, behavioral treatment, 12-step programs, herbal remedies like St. John’s wort, exercise, and diet modifications. About one SSRI user in four really does benefit from the drug, he says, but he adds, “There is no free lunch. Most of these people who feel so good about the long-term use of Prozac think it’s cost-free. Patients need to be better educated about the risk-benefit analysis. If they are taking Prozac to feel ‘better than well,’ that’s a big mistake.”

Originally published in *Harvard Magazine*, May 2000.

<https://www.harvardmagazine.com/2000/05/the-downsides-of-prozac-html>

Why I Think Antidepressants Cause More Harm Than Good

by Peter C. Gøtzsche

In *The Lancet Psychiatry*, David Nutt and colleagues⁷² stated that headlines such as “Antidepressants do more harm than good” plumb a “new nadir in irrational polemic.” I disagree and describe here the evidence that supports my argument so that readers can judge for themselves what they think about the defence of these drugs by Nutt and colleagues.

With regard to the benefits of antidepressants, in its large meta-analysis of 100,000 patients, half of whom were depressed, the US Food and Drug Administration (FDA) noted that 10% more patients responded on antidepressants than did those on placebo,⁷³ and the Cochrane review of depressed patients reported similar results⁷⁴ (i.e., one patient might benefit for every ten patients treated).

I believe those results were exaggerated, however, for several reasons.⁷⁵ Most importantly, the trials were not effectively blinded. Antidepressants have conspicuous side-effects and many patients and their doctors will therefore know whether the blinded drug is active or placebo. A systematic review of 21 trials⁷⁶ in a variety of diseases that had both masked and non-masked outcome assessors, and which had mostly used subjective outcomes, found that the treatment effect was exaggerated by 36% on average (measured as odds ratio) when non-masked observers rather than masked ones assessed the effect. The effect of antidepressants is assessed on highly subjective scales (e.g., the Hamilton scale), and if we assume that the blinding is broken for all patients in the trials and adjust for the bias, we will find that antidepressants have no effect (odds ratio 1.02).⁷⁷

However, I do not believe that the blinding is always broken, only that the reported effect is highly likely to have been exaggerated. Many years ago, adequately blinded trials of tricyclic antidepressants were done, in which the placebo contained atropine, which causes dryness in the mouth like the active drugs do. These trials reported very

⁷² Nutt DJ, Goodwin GM, Bhugra D, Fazel S, Lawrie S. “Attacks on antidepressants: signs of deep-seated stigma?” *Lancet Psychiatry* 2014 ; 1: 103–04.

⁷³ Laughren TP. Overview for December 13 Meeting of psychopharmacologic drugs advisory committee (PDAC). 2006 Nov 16. <http://www.fda.gov/ohrms/dockets/ac/06/briefing/2006-4272b1-01-FDA.pdf> (accessed Oct 22, 2012).

⁷⁴ Arroll B, Elley CR, Fishman T, et al. “Antidepressants versus placebo for depression in primary care.” *Cochrane Database Syst Rev* 2009; 3: CD007954.

⁷⁵ Gøtzsche PC. *Deadly medicines and organised crime: how big pharma has corrupted health care*. London: Radcliffe Publishing, 2013.

⁷⁶ Hróbjartsson A, Thomsen AS, Emanuelsson F, et al. “Observer bias in randomised clinical trials with binary outcomes: systematic review of trials with both blinded and non-blinded outcome assessors.” *BMJ* 2012; 344: e1119.

⁷⁷ See footnote 4. [aka footnote 75]

small, clinically insignificant effects of tricyclic antidepressants compared with placebo (standardised mean difference 0·17, 95% CI 0·00–0·34).⁷⁸

Another worrying finding in randomised trials is that as many patients stop treatment on SSRIs as on placebo for any reason.⁷⁹ After only 2 months, half the patients have stopped taking the drug.⁸⁰ This finding suggests that, overall, considering benefits and harms together, the patients find the drugs useless. More importantly, no research shows whether these drugs work for the outcomes that really matter, such as saving relationships and getting people back to work.

With respect to the harms of antidepressants, most patients who take these drugs will experience side-effects. The package inserts list many common side-effects, of which one of the most frequent is sexual problems. In a study⁸¹ designed to assess this side-effect, sexual problems developed in 604 (59%) of 1,022 patients who all reported no problems with sexual function before they started using an antidepressant. The symptoms include decreased libido (50% of patients on fluoxetine), delayed orgasm or ejaculation (also 50%), no orgasm or ejaculation (39%), and erectile dysfunction or decreased vaginal lubrication (22% for both combined).

Even when tapering off them slowly, half the patients have difficulty stopping the drugs because of withdrawal effects, which can be severe⁸² and long-lasting.⁸³ We noted that withdrawal symptoms were described in similar terms for benzodiazepines and SSRIs and were very similar for 37 of 42 identified symptoms.⁸⁴ However, they were not described as dependence for SSRIs.⁸⁵ To define similar problems as “dependence” in the case of benzodiazepines and as “withdrawal reactions” in the case of SSRIs is irrational. For patients, the symptoms are just the same; it can be very hard for them to stop either type of drug.

Psychiatrists often argue, as did Nutt and colleagues,¹ that antidepressants protect against suicide. However, I believe that no good evidence in support of this idea exists. Good observational studies have refuted it,⁸⁶ and results from randomised trials⁸⁷ have

⁷⁸ Moncrieff J, Wessely S, Hardy R. “Active placebos versus antidepressants for depression.” *Cochrane Database Syst Rev* 2004; 1: CD003012.

⁷⁹ Barbui C, Furukawa TA, Cipriani A. “Effectiveness of paroxetine in the treatment of acute major depression in adults: a systematic re-examination of published and unpublished data from randomized trials.” *CMAJ* 2008; 178: 296–305.

⁸⁰ Serna MC, Cruz I, Real J, *et al.* “Duration and adherence of antidepressant treatment (2003 to 2007) based on prescription database.” *Eur Psychiatry* 2010; 25: 206–13.

⁸¹ Montejo A, Llorca G, Izquierdo J, *et al.* “Incidence of sexual dysfunction associated with antidepressant agents: a prospective multicenter study of 1022 outpatients. Spanish Working Group for the study of psychotropic-related sexual dysfunction.” *J Clin Psychiatry* 2001; 62 (suppl 3): 10–21.

⁸² Fava GA, Bernardi M, Tomba E, *et al.* “Effects of gradual discontinuation of selective serotonin reuptake inhibitors in panic disorder with agoraphobia.” *Int J Neuropsychopharmacol* 2007; 10: 835–38.

⁸³ See footnote 4. [aka 75]

⁸⁴ See footnote 14. [aka 85]

⁸⁵ Nielsen M, Hansen EH, Gøtzsche PC. “What is the difference between dependence and withdrawal reactions? A comparison of benzodiazepines and selective serotonin re-uptake inhibitors.” *Addiction* 2012; 107: 900–08.

⁸⁶ Zahl PH, De Leo D, Ekeberg Ø, *et al.* “The relationship between sales of SSRI, TCA and suicide rates in the Nordic countries.” *BMC Psychiatry* 2010; 10: 62.

shown that antidepressants are associated with increased risk of suicide attempts (5.6 more suicide attempts per 1,000 patient-years of SSRI exposure compared with placebo). Antidepressants have not only been associated with suicide but also with homicide.⁸⁸ The FDA's analysis⁸⁹ showed that suicidal behaviour is increased with antidepressants until about the age of 40 years—but in fact, the situation is much worse than this. Suicides and suicide attempts were vastly underreported in the FDA's analysis for various reasons.⁹⁰ For example, only five deaths by suicide were recorded in 52,960 patients on antidepressants in the 2006 FDA analysis⁹¹ whereas five deaths by suicide were recorded in 2,963 patients on paroxetine alone in a meta-analysis from 1993.⁹²

SSRIs are particularly harmful for elderly patients. Results from a carefully controlled cohort study¹⁸ of people older than 65 years of age with depression showed that SSRIs led to falls more often than did older antidepressants or if the depression was left untreated. For every 28 elderly people treated for 1 year with an SSRI, there was one additional death, compared with no treatment.⁹³ SSRIs have also stimulant effects and might precipitate conversion to bipolar disorder in about 10% of children aged 10–14 years under the care of mental health services.⁹⁴

SSRIs are very poor drugs and I doubt they are safe at any age. The first SSRI was fluoxetine, which the German drug regulator deemed “totally unsuitable for the treatment of depression”.⁹⁵ I, and others⁹⁶ have written about the controversy surrounding this drug and the process by which it nevertheless came to be approved and widely used.

I have written previously⁹⁷ that there has been heavy marketing and widespread crime committed by drug companies, including fraud, illegal promotion, and corruption of psychiatrists. In the USA, psychiatrists receive more money from the drug industry than any other specialty.⁹⁸ As a result, enough antidepressants are prescribed every year in Denmark to provide treatment for every person in the country for 6 years of their

⁸⁷ Fergusson D, Doucette S, Glass KC, *et al.* “Association between suicide attempts and selective serotonin reuptake inhibitors: systematic review of randomised controlled trials.” *BMJ* 2005; 330: 396.

⁸⁸ See footnote 4; Healy D. *Let Them Eat Prozac*. New York: New York University Press; 2004; Moore TJ, Glenmullen J, Furberg CD. “Prescription drugs associated with reports of violence towards others.” *PLoS One* 2010; 5: e15337; Lucire Y, Crotty C. Antidepressant-induced akathisia-related homicides associated with diminishing mutations in metabolizing genes of the CYP450 family. *Pharmacogenomics Pers Med* 2011; 4: 65–81.

⁸⁹ See footnote 2. [73]

⁹⁰ See footnote 4. [75]

⁹¹ See footnote 2. [73]

⁹² Montgomery SA, Dunner DL, Dunbar GC. Reduction of suicidal thoughts with paroxetine in comparison with reference antidepressants and placebo. *Eur Neuropsychopharmacol* 1995; 5: 5–13.

⁹³ Coupland C, Dhiman P, Morriss R, *et al.* “Antidepressant use and risk of adverse outcomes in older people: population based cohort study.” *BMJ* 2011; 343: d4551.

⁹⁴ Martin A, Young C, Leckman JF, *et al.* “Age effects on antidepressant-induced manic conversion.” *Arch Pediatr Adolesc Med* 2004; 158: 773–80.

⁹⁵ See footnote 14; Internal Eli Lilly memo. Bad Homburg. 1984 May 25 (available on request). Publishing, 2010.

⁹⁶ See footnote 4; Virapen J. *Side effects: death*. College Station: Virtualbookworm.com Publishing, 2010.

⁹⁷ See footnote 4 [75].

⁹⁸ See footnote 4 [75]; Insel TR. “Psychiatrists’ relationships with pharmaceutical companies: part of the problem or part of the solution?” *JAMA* 2010; 303: 1192–93.

lives.⁹⁹ I believe this situation is not sound and that it also partly portrays the fact that many patients cannot stop these drugs because of intolerable withdrawal symptoms.

SSRIs have been shown to have minimal or non-existent benefit in patients with mild or moderate depression¹⁰⁰ and I think they might not even work for severe depression.¹⁰¹ They should be used very sparingly, if at all, and always with a clear plan for tapering off them. The so-called maintenance studies, in which patients after successful treatment get randomly assigned to continue with the drug or a placebo, cannot be interpreted as showing that the patients still need the drug because withdrawal symptoms, which can include depression, are inflicted on the placebo group.

Nutt and two of his co-authors, Guy M Goodwin and Stephen Lawrie, have between them declared 22 conflicts of interest in relation to drug companies.¹⁰² I wonder whether this declaration explains their dismissal of psychotherapy (although it is effective and recommended by NICE) and their description of my evidence-based views as a somewhat irrational polemic that is insulting to the discipline of psychiatry and is reinforcing stigma against mental illnesses. They also talk about anti-psychiatry, anti-capitalism, and a conspiracy theory. This is the language of people who are short of arguments.

Originally published as: Gøtzsche, Peter C. “Why I think antidepressants cause more harm than good.” *The Lancet Psychiatry* 1, no. 2 (2014): 104-106.

⁹⁹ See footnote 4. [75]

¹⁰⁰ Fournier JC, DeRubeis RJ, Hollon SD, *et al.* “Antidepressant drug effects and depression severity: a patient-level meta-analysis.” *JAMA* 2010; 303: 47–53.

¹⁰¹ See footnote 4. [75]

¹⁰² See footnote 1. [footnote 72]

As Pharmaceutical Use Soars, Drugs Taint Water and Wildlife

by Sonia Shah

With nearly \$800 billion in drugs sold worldwide, pharmaceuticals are increasingly being released into the environment. The “green pharmacy” movement seeks to reduce the ecological impact of these drugs, which have caused mass bird die-offs and spawned antibiotic-resistant pathogens.

The standard that new drugs be safe for human consumption was first enshrined in U.S. regulations in 1938, after an antibacterial drug dissolved in a poisonous solvent killed 100 children. Now, armed with a range of evidence suggesting that wildlife and human health may be threatened by pharmaceutical residues that escape into waterways and elsewhere, a growing band of concerned ecotoxicologists and environmental chemists are calling for yet another standard for new medications: that they be designed to be safe for the environment.

The movement for “green pharmacy,” as it has been dubbed, has grown as new technology has allowed scientists to discern the presence of chemicals in the environment at minute concentrations, revealing the wide dispersal of human and veterinary drugs across the planet. In recent years, scientists have detected trace amounts of more than 150 different human and veterinary medicines in environments as far afield as the Arctic. Eighty percent of the U.S.’s streams and nearly a quarter of the nation’s groundwater sampled by the United States Geological Survey (USGS) has been found to be contaminated with a variety of medications.

This contamination is poised to worsen as the global appetite for medications swells. The drug industry sold \$773 billion worth of drugs worldwide in 2008, more than double the amount sold in 2000, and with an aging population and ever-cheaper manufacturing, pharmaceutical production is expected to grow 4 to 7 percent annually until at least 2013. Americans bring home more than 10 prescription drugs per capita per year, consuming an estimated 17 grams of antibiotics alone—more than three times the per capita rate of consumption in European countries such as Germany. U.S. livestock consume even more, with farmers dispensing 11,000 metric tons of antimicrobial medications every year, mainly to promote the growth of animals.

Drugging our bodies inevitably drugs our environment, too, as many medications can pass through our bodies and waste treatment facilities virtually intact. And it is difficult to predict where and how unexpectedly vulnerable creatures may accrue potentially toxic doses. Take, for example, the ongoing mass poisoning of vultures in South Asia by anti-arthritis painkillers.

The popular anti-inflammatory and arthritis drug, diclofenac, is sold worldwide under more than three dozen different brand names, and is used in both human and veterinary medicine. In India, farmers started dosing their cows and oxen with the drug in

the early 1990s to relieve inflammation that could impair the animals' ability to provide milk or pull plows. Soon, about 10 percent of India's livestock harbored some 300 micrograms of diclofenac in their livers. When they died, their carcasses were sent to special dumps and picked clean by flocks of vultures. It was an efficient system, for unlike feral dogs and plague-infested rats, South Asia's abundant vulture population — estimated at more than 60 million in the early 1990s — carried no human pathogens and was resistant to livestock diseases such as anthrax.

But vultures who fed on the treated carcasses accrued a dose of diclofenac of around 100 micrograms per kilogram. A person with arthritis would need 10 times that amount to feel an effect, but it was enough to devastate the vultures. Between 2000 and 2007, the South Asian vulture population declined by 40 percent every year; today, 95 percent of India's Gyps vultures and 90 percent of Pakistan's are dead, due primarily to the diclofenac that scientists have found lurking in their tissues. South Asian and British scientists who experimentally exposed captive vultures to diclofenac-dosed buffalo found that the birds went into renal failure — scientists still don't know why — and died within days of exposure. As the vulture population has declined, the feral dog population has boomed, and the Indian government's attempt to control the rabies they carry has started to flounder.

The governments of India, Pakistan, and Nepal banned veterinary use of diclofenac in 2006, but the drug has still not disappeared from livestock tissues.

And last year scientists found that another arthritis drug—ketoprofen—is similarly deadly for the birds.

The poisoning of vultures, while dramatic, is not the only worrisome impact of our medicated environment. Scientists have discovered a range of adverse effects in wildlife exposed to pharmaceutical residues, from impaired reproduction to less-fit offspring.

For example, freshwater habitats around the world have been found contaminated with the synthetic estrogen used in contraceptive pills, ethynylestradiol. While concentrations are generally found around .5 nanograms per liter, concentrations as high as several hundred nanograms per liter have been reported, as well. A large body of evidence has connected this contamination with excess feminization in fish. In one study, U.S. and Canadian government scientists purposely contaminated an experimental lake in Ontario with around 5 nanograms per liter of ethynyl estradiol, and studied the effects on the lake's fathead minnow population, a common species that fish like lake trout and northern pike feed on. Minnows normally become sexually mature at two years of age and enjoy a single mating season before perishing. Exposed to ethynyl estradiol, the male minnows' testicular development was arrested and they started making early-stage eggs instead. That year's mating season was disastrous. Within two years, the minnow population crashed.

Recent findings in New England of higher concentrations of hermaphroditic frogs around suburban and urban waterways, compared to those in undisturbed and agricultural areas, have led to suspicions that synthetic estrogens may be exerting a similarly disruptive effect on amphibians, according to Yale University ecologist David Skelly, who is currently investigating the possibility.

Our drugged environment could also affect human health. Background levels of antibiotics in the environment may be hastening the emergence of difficult-to-control antibiotic-resistant pathogens. Bacteria share genes across species, and so any increased

drug resistance in one species can cross into other, more pathogenic species. As one might suspect, scientists have found that tried to reproduce the effects of these mixtures by studying the impacts of combinations of compounds commonly found together in the environment — analyzing, for example, the effects of trace amounts of the antidepressant, fluoxetine, and the herbicide clofibric acid. They've found that low concentrations of fluoxetine have no effect on water fleas. Nor do low concentrations of clofibric acid. But if water fleas are exposed to both compounds in combination, the mixture will kill more than half.

Similarly, water fleas suffer no adverse effect when exposed to low concentrations of the antibiotics erythromycin, triclosan, and trimethoprim. But if exposed to all three simultaneously, scientists have found, water fleas' sex ratios become skewed.

Such impacts may intensify as the climate changes, especially in poor, arid countries. Countries with few resources and little water are more likely to recycle wastewater into drinking water, particularly as their regions become more arid, increasing the concentrations of pharmaceuticals and other contaminants. "This is becoming a more potent problem," says University of Freiburg environmental chemist and leading green-pharmacy advocate Klaus Kümmerer. "We may have a closed cycle, and compounds may become enriched."

Environmental toxicologists agree that while many of the adverse effects they've found in wildlife have been subtle, there is nothing preventing a vulture-like die-off from pharma poisoning elsewhere. "The vultures would have been a tough one to predict," says Mitchell Kostich, who studies the ecological risks of pharmaceuticals at the U.S. Environmental Protection Agency (EPA). "Are we going to be able to predict those kind of cases?"

Given the current state of knowledge and today's regulatory infrastructure, probably not. Diclofenac was first launched in the mid-1970s, before regulators in the U.S. or Europe required environmental assessments of new drugs. Today, the U.S. Food and Drug Administration (FDA) only requires drug companies to file an environmental assessment if drugmakers plan to manufacture more than 40 tons of a drug. In 2008, just 20 out of more than 10,000 claimants were required to file such an assessment. And the FDA only requires assessments of a single manufacturer's contribution, not the total volume of the drug that may be produced or leaked into the environment.

Even if a comprehensive environmental assessment had been required, it is unlikely that diclofenac's effect on vultures would have been detected. Toxicity testing on wildlife is generally conducted on aquatic species, under the assumption that most environmental exposures to pharmaceuticals will occur via wastewater. The most commonly used species for such testing is the crustacean *Daphnia*, also known as the water flea. "If there is an effect on *Daphnia*, there may be an effect on other organisms," says Kümmerer, "But there is no organism that is the most sensitive organism. Test organisms are a compromise between sensitivity and ease of rearing in the lab, and availability."

And some species, such as Old World vultures, have idiosyncratic reactions. "Chickens could eat diclofenac and have no effect," notes Brunel University ecotoxicologist John Sumpter. So could New World vultures, who likewise seem mysteriously impervious to the drug. And neither FDA nor European Union rules empower regulators to ban a human medicine based solely on environmental concerns.

While EPA and USGS scientists hope to figure out which pharmaceuticals are most dangerous in the environment and help wastewater treatment facilities learn how to screen for and treat them, green-pharmacy advocates such as Kümmerer are calling for a whole new approach to medicine-making. They argue that rather than aim for the most biologically potent, long-lasting compounds—the miracle cures that have long been the Holy Grail of pharmacology—drug-makers should create drugs that are “benign by design” and should consider environmental impact *before* new drugs are brought to market. Such an approach could lead to a new category of “green drugs”: compounds that biodegrade quickly and easily in the environments they inevitably end up in.

In the past dozen years, three new diseases have decimated populations of amphibians, honeybees, and — most recently — bats. Increasingly, scientists suspect that low-level exposure to pesticides could be contributing to this rash of epidemics.

Drug companies have already made strides in reducing waste in manufacturing because it saves them money and energy, Kümmerer says. But in order to convince companies to consider a drug’s environmental impact, extra incentives will most likely be required. One incentive put forward by the European Environment Agency in January would involve extending patent protection for drugs that are safe, effective, and environmentally friendly.

That alone, by providing a solid boost to profit margins, could prove a powerful incentive for drug companies, and could help unleash a new generation of more easily degradable green drugs. Such drugs will not be as easy to store and distribute as today’s drugs, though. Sensitive to sunlight and heat, they’ll be more likely to be packaged in darkened bottles and require refrigeration. And then it will be up to us, as patients, to choose them anyway — and heal ourselves without sickening our environment.

Previously published at: Shah, Sonia. “As Pharmaceutical Use Soars, Drugs Taint Water and Wildlife.” *Yale Environment* 360. 15 April 2010.

https://e360.yale.edu/features/as_pharmaceutical_use_soars_drugs_taint_water_and_wildlife

The *New York Times* Uncritically Repeats Discredited Antidepressant Claims

by Bruce E. Levine

On November 8, 2022, the *New York Times* published “Antidepressants Don’t Work the Way Many People Think,”¹⁰³ noting the following: “A paper published earlier this year made headlines for presenting several decades’ worth of evidence that people with depression don’t have less serotonin than people who are not depressed.” The “paper” referred to is a comprehensive review of the research, published in *Molecular Psychiatry* in July 2022,¹⁰⁴ lead-authored by psychiatrist Joanna Moncrieff, co-chairperson of the Critical Psychiatry Network, who concluded that there is no evidence for the serotonin imbalance theory of depression.

The *Times* article uncritically reported the responses of leading figures in psychiatry to Moncrieff’s review. They asserted: (1) her conclusions are not news, as the serotonin imbalance theory of depression is an “old theory” that has long been discarded by psychiatry; and (2) it does not matter that antidepressants do not work to correct a chemical imbalance because antidepressants are very effective.

These responses should have resulted in at least two questions for serious journalists and their editors: (1) If the serotonin imbalance theory of depression—an idea which convinced many people to take selective serotonin reuptake inhibitors (SSRIs) such as Prozac, Zoloft, and Celexa so as to correct this imbalance—has long been discarded by psychiatry, why has Moncrieff’s findings, as the *Times* put it, “made headlines”? (2) Given that antidepressants lack a neurobiological rationale of correcting a chemical imbalance, what is the evidence that antidepressants are scientifically effective (i.e., more effective than a placebo, and more effective than the simple passage of time)?

With regard to the issue of why so many people were unaware that psychiatry has long known that the serotonin imbalance theory of depression was untrue, the *Times* did not investigate whether psychiatry authorities had continued asserting this theory after research had disproven it. Others have investigated this issue (more later on this).

With regard to the second issue of antidepressant effectiveness, the *Times* article included a section titled “What do we know about antidepressant effectiveness?” While noting the significance of the placebo effect in outcome studies, the *Times* focused primarily on one study, the “Sequenced Treatment Alternatives to Relieve Depression” (STAR*D), and the *Times* uncritically accepted its sources’ assertion that STAR*D had clearly proven the effectiveness of antidepressants. The *Times* did not mention that the

¹⁰³ <https://www.nytimes.com/2022/11/08/well/mind/antidepressants-effects-alternatives.html>

¹⁰⁴ Moncrieff, J., Cooper, R.E., Stockmann, T. *et al.* “The serotonin theory of depression- a systematic umbrella review of the evidence.” *Molecular Psychiatry* (2022)-1-14. <https://www.nature.com/articles/s41380-022-01661-0>

STAR*D remission rate had been criticized even within the psychiatry establishment as greatly inflated, and that other researchers have concluded that an analysis of the STAR*D data points to “real-world” ineffectiveness of antidepressants.

The STAR*D Study

Funded by the National Institute of Mental Health (NIMH) in the early 2000s, STAR*D results were reported on in 2006.¹⁰⁵ Its goal was to assess antidepressant effectiveness in the “real world”—where depressed patients who don’t remit with one antidepressant are prescribed another. Thus, there were four treatment stages in STAR*D, each lasting three months. In the first stage, all depressed patients received the SSRI antidepressant Celexa, and these Celexa-treated patients who failed to have remission of depression symptoms were then, in a second three-month stage, assigned to several other treatment modes, including the substitution of Celexa with other antidepressants. Depressed patients who continued to be non-remitters after these first two stages were encouraged to enter a third stage which included other types of antidepressants; and for those who continued to be non-remitters; there was a fourth stage of other antidepressants.

The *Times*, uncritically repeating the STAR*D authors’ claim, reported that “nearly 70 percent of people had become symptom-free by the fourth antidepressant.” Unreported by the *Times* was this glaring conflict of interest: In the 2006 STAR*D report, at its end in small print, are the details of the financial relationships of the two lead STAR*D investigators (psychiatrists A. John Rush and Madhukar H. Trivedi) with multiple pharmaceutical companies, including the manufacturers of several of the antidepressants used in STAR*D, such as Forest Pharmaceuticals (Celexa), Wyeth-Ayerst Laboratories (Effexor), GlaxoSmithKline (Wellbutrin), and Pfizer (Zoloft). Also detailed were the financial relationships of the several other STAR*D investigators with drug companies (Rush *et al*, 2006: 1914-1915).

The *Times* article did report one obvious problem with STAR*D, “One critique of the STAR*D trial is that it didn’t compare the medications against a placebo.” This failure to include a control group is only the tip of a large iceberg of STAR*D methodological problems, obfuscations, and deceptions that went unreported by the *Times*.

Before examining the STAR*D study issues that render its “nearly 70 percent” (more precisely, 67 percent) remission rate statistic meaningless, it is important to keep in mind that even if that 67 percent rate was valid, such a year-long cumulative remission rate is not evidence of antidepressant effectiveness. Unreported by the *Times* was another 2006 NIMH-funded study, “The Naturalistic Course of Major Depression in the Absence of Somatic Therapy,” that found 85 percent of the non-medicated patients recovered within a year, and the authors concluded: “If as many as 85% of depressed individuals who go without somatic treatments [which include antidepressants] spontaneously recover within one year, it would be extremely difficult for any intervention to demonstrate a superior result to this.”¹⁰⁶

¹⁰⁵ A. John Rush, *et al*. “Acute and Longer-Term Outcomes in Depressed Outpatients Requiring One or Several Treatment Steps: A STAR*D Report,” *American Journal of Psychiatry* 163 (2006): 1905–1917: <https://ajp.psychiatryonline.org/doi/pdf/10.1176/ajp.2006.163.11.1905>

¹⁰⁶ Michael A. Posternak, *et al*. “The Naturalistic Course of Major Depression in the Absence of Somatic Therapy,” *The Journal of Nervous and Mental Disease* 194, no. 5 (2006): 324-329.

Returning to STAR*D's reported 67 percent remission rate, even within the psychiatry establishment, this rate was disputed as soon as it was published. The first critique of it appeared as an editorial in the same 2006 issue of the *American Journal of Psychiatry* that the STAR*D study had been reported. In this critique, "The STAR*D Study: A Four-Course Meal That Leaves Us Wanting More," psychiatrist J. Craig Nelson notes that 67 percent remission rate did not account for relapse, nor for patients who discontinued treatment.¹⁰⁷ Nelson stated the following: "Among those achieving remission, relapse rates [in Step 1 thru Step 4] were 33.5%, 47.4%, 42.9%, and 50.0% If the goal of treatment is sustained recovery, relapse should be considered. I found a cumulative sustained recovery rate of 43% after four treatments, using a method similar to the authors but taking relapse rates into account."

When researchers outside of the psychiatry establishment began looking under the STAR*D hood, their conclusions about antidepressant effectiveness in the real world were the opposite of the STAR*D authors. One critique was authored by psychologists Allan Leventhal and David Antonuccio, published in 2009 in *Ethical Human Psychology and Psychiatry*,¹⁰⁸ another was lead-authored by psychologist Edmund Pigott, published in 2010 in *Psychotherapy and Psychosomatics*¹⁰⁹ (which was also reported on in 2010 by *Medscape Medical News*).¹¹⁰

Among their most devastating STAR*D revelations was the uncovering of the following: Of the initial STAR*D cohort of 4,041 patients who started on Celexa, 370 dropped out within 2 weeks (foregoing \$25 payments for future assessments); and from the remaining 3,671 patients, only 108 of them—or approximately 3%—had a "sustained remission" (in other words, they had remitted, stayed well, and did not drop out but remained in the trial for follow up).

Also uncovered in the STAR*D study were egregious methodological issues, including: inflating remission rates by, after the study began, switching from the pre-specified primary outcome measure (the HRSD) to another scale (QIDS-SR) as the primary outcome measure, a switch that inflated the remission rate; and including in the total remission rate those patients who remitted but weren't depressed enough at baseline to meet study criteria.

What other antidepressant studies, unexamined by the *Times*, might have interested its readers? A 2022 large study, lead-authored by Marc Stone at the FDA's Center for Drug Evaluation and Research, examined 232 randomized, double blind, placebo controlled trials on antidepressants (submitted by drug companies to the FDA between 1979 and 2016).¹¹¹ Even in these drug-company studies, Stone and his co-researchers found that only "15% of participants have a substantial antidepressant effect beyond a placebo effect." Moreover, drug company antidepressant trials submitted to the FDA are routinely short-term studies, usually around six weeks. In 2017, "Poorer Long-Term Outcomes among Persons with Major Depressive Disorder Treated with

<https://www.madinamerica.com/wp-content/uploads/2011/12/The%20naturalistic%20course%20of%20major%20depression%20n%20the%20absence%20of%20somatic%20therapy.PDF>

¹⁰⁷ <https://ajp.psychiatryonline.org/doi/10.1176/ajp.2006.163.11.1864>

¹⁰⁸ <https://www.ingentaconnect.com/content/springer/ehpp/2009/00000011/00000003/art00006>

¹⁰⁹ H.E. Pigott, *et al.* "Efficacy and Effectiveness of Antidepressants: Current Status of Research." *Psychotherapy and Somatics* 79, no. 5, 2010. <https://www.karger.com/Article/FullText/318293>

¹¹⁰ https://www.medscape.com/viewarticle/727323?src#vp_2

¹¹¹ <https://www.bmj.com/content/378/bmj-2021-067606>

Medication,” published in *Psychotherapy and Somatics*, found that controlling for depression severity, the outcomes of 3,294 subjects over a nine-year period showed that antidepressants may have had an immediate, short-term benefit for some people, but at the nine-year follow-up, antidepressant users had significantly more severe symptoms than those individuals not using antidepressants.¹¹²

Yet if all one knew about antidepressants was from the November 9, 2022 *New York Times* article, one would believe that in the real world, antidepressants are scientifically effective, and that “nearly 70 percent of people had become symptom-free by the fourth antidepressant.”

Psychiatry and the Widespread Belief in the Chemical Imbalance Theory

Furthermore, if all one knew about the serotonin imbalance theory of depression was from that November 9, 2022 *New York Times* article, one would believe that psychiatry has long known it was untrue but is not responsible for the fact that much of the general public has been unaware that it was disproven decades ago.

The *Times* reported that “starting in the 1990s, researchers began to understand that depression was much more complicated, and that serotonin played only a nominal role.” In response to Moncrieff’s review that concluded no evidence for the serotonin imbalance theory of depression, the *Times* quoted Daniel Iosifescu, a professor of psychiatry at N.Y.U. Langone Health, “To me, that is an old theory for depression. That was already invalidated 20 years ago, so we’re just essentially putting the nail in the coffin, so to speak.”

The *Times* uncritically accepted psychiatry’s claim that it is not their fault that the chemical imbalance theory of depression has continued to have widespread belief by the general public. The *Times* explained the theory’s persistence this way: “This so-called ‘chemical imbalance’ theory gained a foothold in the cultural psyche and was promoted by ads for the medications.” While Big Pharma certainly had a major role in maintaining the disproven chemical imbalance theory, the reality is that so too did psychiatry at its highest levels.

Journalist Robert Whitaker investigated whether or not psychiatry officialdom had proclaimed this chemical imbalance theory to be true long after the research had rejected it. In his August 2022 “Psychiatry, Fraud, and the Case for a Class-Action Lawsuit,” published in the webzine *Mad in America*, he documents the evidence that contradicts psychiatry’s claim.¹¹³ One of several examples he provides that contradicts this claim is the American Psychiatric Association (APA), in its 2005 publication for the general public, “Let’s Talk Facts about Depression,” stated: “Antidepressants may be prescribed to correct imbalances in the levels of chemicals in the brain”;¹¹⁴ and this claim continued to be stated for the next 16 years until 2021, when psychiatrist Ronald Pies reported that he managed to get the APA to delete that message.¹¹⁵

¹¹² <https://www.karger.com/Article/Abstract/479162>

¹¹³ <https://www.madinamerica.com/2022/08/psychiatry-fraud-and-the-case-for-a-class-action-lawsuit/>

¹¹⁴ <http://www.fcphp.usf.edu/courses/content/rfast/Resources/depression.pdf>

¹¹⁵ <https://www.psychiatristimes.com/view/what-we-tell-patients-about-depression-what-they-say-they-have-been-told>

Psychologist Philip Hickey's 2014 review "Psychiatry DID Promote the Chemical Imbalance," published in *Mad in America*, documents how prominent mental illness consumer organizations—with scientific advisory councils made up of the leading figures in psychiatry—continued to proclaim the chemical imbalance theory as fact after it had been disproven.¹¹⁶ Hickey documents that one the most well-know of these organizations, the National Alliance on Mental Illness (NAMI), stated in 2014 (since deleted): "Scientists believe that if there is a chemical imbalance in these neurotransmitters [norepinephrine, serotonin, dopamine], then clinical states of depression result."

Whitaker notes that, "While many consumer organizations have now scrubbed such claims from their sites, they have not disappeared altogether," offering the example of the Child Mind Institute, founded by prominent child psychiatrist, Harold Koplewicz, longtime editor-in-chief of the *Journal of Child and Adolescent Psychopharmacology*. Remaining on the Child Mind Institute website in "Medication for Kids with Depression," it is stated: "Antidepressants usually work by balancing the levels of neurotransmitters—chemicals that send signals between neurons—in the brain. These chemicals include serotonin, dopamine, and norepinephrine. Higher levels of these chemicals usually correspond with lower levels of depression."¹¹⁷

STAR*D, Chemical Imbalances, and WMDs

What caused the *New York Times* to uncritically accept its sources' claim that STAR*D is evidence of antidepressant real-world effectiveness? What caused the *Times* to uncritically accept the narrative that psychiatry has no responsibility for the public continuing to believe in the serotonin chemical imbalance theory of depression after it had been disproved? One reason appears to be the same reason that the *Times* famously got it wrong in its 2002 and 2003 reporting of weapons of mass destruction (WMDs) in Iraq.

On May 26, 2004, *New York Times* editors published an acknowledgement¹¹⁸ of failing their journalistic responsibility with respect to reporting about dangers posed by Saddam Hussein and WMDs (one of many such examples, its September 8, 2002 lead article headlined "U.S. Says Hussein Intensified Quest for A-Bomb Parts"). Below is an excerpt from this acknowledgement that is relevant to the *Times* recent report of psychiatry's disproven claims:

"In some cases, information that was controversial then, and seems questionable now, was insufficiently qualified or allowed to stand unchallenged. . . . The problematic articles . . . depended at least in part on information from a circle of Iraqi informants, defectors and exiles bent on 'regime change' in Iraq, people whose credibility has come under increasing public debate in recent weeks. . . . Complicating matters for journalists, the accounts of these exiles were often eagerly confirmed by United States officials convinced of the need to intervene in Iraq. . . . Some critics of our coverage during that time have focused blame on individual reporters. Our examination, however, indicates that the problem was more complicated. Editors at several levels who should have been challenging reporters and pressing for more skepticism were perhaps too intent on rushing scoops into the paper."

¹¹⁶ <https://www.madinamerica.com/2014/06/psychiatry-promote-chemical-imbalance-theory/>

¹¹⁷ <https://childmind.org/article/medication-for-kids-with-depression/>

¹¹⁸ <https://www.nytimes.com/2004/05/26/world/from-the-editors-the-times-and-iraq.html>

While readers of the *New York Times* assume that skeptical reporters and even more skeptical editors are zealously considering the motives and conflicts of interest of their sources, the fact of the matter, acknowledged by the *Times*, is that a lack of such skepticism resulted in the *Times* being used by those intent on regime change in Iraq.

The *New York Times* on November 8, 2022, in its “Antidepressants Don’t Work the Way Many People Think,” repeated the same mistake of a lack of skepticism about the motives and conflicts of interest of its sources.

For serious journalists and editors, it should be obvious that the institution of psychiatry was put into a difficult position by the widespread public attention of Moncrieff’s review that concluded no evidence for the serotonin imbalance theory of depression, and that the psychiatry establishment had a strong need for damage control to its credibility. And it should also be obvious that psychiatry, as an institution, has a powerful motive for declaring antidepressants to be very effective regardless of the lack of a neurobiological rationale of correcting a chemical imbalance—the rationale that has convinced so many people to use SSRI antidepressants.

Sadly, the *New York Times*, once again, evidenced no skepticism about declarations from sources with powerful motives to persuade the public to believe a self-serving narrative that is disputed by the evidence.

Originally published on *Counterpunch*: Levine, Bruce E. “The New York Times Uncritically Repeats Discredited Antidepressant Claims.” *Counterpunch* 21 December 2022. <https://www.counterpunch.org/2022/12/21/the-new-york-times-uncritically-repeats-discredited-antidepressant-claims/>

Environmental Pollution with Psychiatric Drugs

by Julene Argaluz, Saioa Domingo-Echaburu, Gorka Orive, Juan Medrano, Rafael Hernandez, Unax Lertxundi

Abstract

Among all contaminants of emerging interest, drugs are the ones that give rise to the greatest concern. Any of the multiple stages of the drug's life cycle (production, consumption and waste management) is a possible entry point to the different environmental matrices. Psychiatric drugs have received special attention because of two reasons. First, their use is increasing. Second, many of them act on phylogenetically highly conserved neuroendocrine systems, so they have the potential to affect many non-target organisms. Currently, wastewater is considered the most important source of drugs to the environment. Furthermore, the currently available wastewater treatment plants are not specifically prepared to remove drugs, so they reach practically all environmental matrices, even tap water. As drugs are designed to produce pharmacological effects at low concentrations, they are capable of producing ecotoxicological effects on microorganisms, flora and fauna, even on human health. It has also been observed that certain antidepressants and antipsychotics can bioaccumulate along the food chain. Drug pollution is a complicated and diffuse problem characterized by scientific uncertainties, a large number of stakeholders with different values and interests, and enormous complexity. Possible solutions consist on acting at source, using medicines more rationally, eco-prescribing or prescribing greener drugs, designing pharmaceuticals that are more readily biodegraded, educating both health professionals and citizens, and improving coordination and collaboration between environmental and healthcare sciences. Besides, end of pipe measures like improving or developing new purification systems (biological, physical, chemical, combination) that eliminate these residues efficiently and at a sustainable cost should be a priority. Here, we describe and discuss the main aspects of drug pollution, highlighting the specific issues of psychiatric drugs.

Core Tip: *Psychiatric drugs have received special attention as contaminants of emerging interest because of two reasons: First, their use is increasing. Second, many act on phylogenetically conserved neuroendocrine systems, potentially affecting many non-target organisms. Drug pollution is a complicated problem involving many stakeholders with different values and interests. Solutions can be applied at source, using medicines more rationally, prescribing greener drugs or designing pharmaceuticals that are more biodegradable. Besides, end of pipe measures, e.g., developing new purification systems will also be crucial. Finally, educating both health professionals and citizens, and collaboration between environmental and healthcare sciences is going to be essential.*

INTRODUCTION

Toxic problems caused by chemicals, such as aromatic compounds, polychlorinated biphenyls, heavy metals, pesticides, etc., are well known. However, concern regarding the so-called “pollutants of emerging interest” is increasing, with pharmaceuticals causing the greatest concern. Pharmaceutical products have two important characteristics

that are driving this preoccupation: Firstly, they produce pharmacological effects at low concentrations, such as those found in the environment. Secondly, they are designed with stability in mind, so they are more likely to reach and interact with their target molecules.

THE PROBLEM OF ENVIRONMENTAL POLLUTION WITH PHARMACEUTICALS

Publications in scientific journals regarding the presence of pharmaceutical products in the environment has grown exponentially since the end of the 1990s, due to improvements in analytical techniques allowing for the detection of lower concentrations of drugs in different matrices[1]. Currently available information regarding the presence of pharmaceuticals in the environment and their consequences is simply overwhelming.

A recent study estimated that approximately 4000 different pharmacologically active substances are currently being administered globally, including: Prescription drugs for human use, over-the-counter drugs, and veterinary drugs[2]. Global drug use continues to grow, with an estimate of 4.5 trillion doses consumed in 2020[3]. The trend will probably continue for the following reasons[2]: The age and life expectancy of populations has increased; economies are growing, especially emerging economies, so the capacity and expectations to treat aging and chronic diseases increase; intensification of livestock and aquaculture practices to meet demand; the design of new pharmaceutical products; climate change, which will aggravate existing diseases (both communicable and non-communicable).

Psychiatric drugs have received particular attention above other therapeutic classes for two main reasons: Their widespread use and their potential to provoke ecotoxicological damage. Some authors believe the current situation due to the Coronavirus disease 2019 pandemic may lead to an increase use of certain psychiatric drugs, like anxiolytics or antidepressants[4].

Life cycle of drugs

The liberation, absorption, distribution, metabolism, excretion (LADME) scheme showing the course of drugs in the human organism is still shown in universities across the world. Drugs are first released, then absorbed, distributed, metabolized, and finally excreted outside. But in this anthropocentric scheme, little or no attention is paid to drugs and metabolites once they are excreted outside the organism (Figure 1).

Of course, drugs and their metabolites do not disappear after flushing the toilet, but rather reach the environment in different amounts depending on the proportion metabolized in the body. It has been estimated that the percentage of unchanged drug excreted in feces and urine is between 30% and 90% on average[5].

Any of the multiple stages that make up the life cycle of the drug: production, consumption and waste management; is a possible entry point to the different environmental matrices

In any case, currently the most important source is considered to be wastewater, which includes wastewater of domestic, hospital, industrial and of agricultural or livestock origin. Pollution due to industrial waste disposal was not considered a major factor until recently. Contemporary research shows, however, that certain production factories can cause environmental pollution at levels well above what was previously

thought[6]. For example, very high venlafaxine concentrations were found in a wastewater treatment plant (WWTP) that received the discharge of a large industrial plant near Jerusalem, in Israel[7].

But pharmaceutical products can reach the aquatic environment by other routes, including, for example: aquaculture, runoff water from the agricultural sector, through the removal of sewage sludge (especially when used as fertilizer in agriculture), or leaching to groundwater after rain. Likewise, the presence of pharmaceuticals has to be considered when re-using wastewater in agriculture, a practice that is expected to increase in the near future[8].

The current purification systems: WWTPs

Currently available WWTPs are not specifically designed to remove drugs. Some of them are eliminated, but others remain unchanged and are discharged with the effluents. As an example, a study carried out in the United Kingdom in 2018 estimated that in 13% of the WWTPs available in that country, the effluent contained potentially dangerous concentrations of drugs such as ethynylestradiol, diclofenac, propranolol, macrolide antibiotics and fluoxetine[9]. Sometimes, paradoxically, the drug concentration in the effluent of the WWTP can be even higher than that in the influent. This is due to the microorganisms in charge of the biological (secondary) treatment of wastewater may be in charge of metabolizing the conjugates with glucuronic acid, so that the drug returns to its original form[5]. This is the case with carbamazepine, amitriptyline, lamotrigine, doxepine, citalopram, among many other pharmaceuticals [10]. Besides, a study estimated that up to 70% of all wastewater does not receive treatment before being discharged, so the situation in developing countries is probably even worse[11,12].

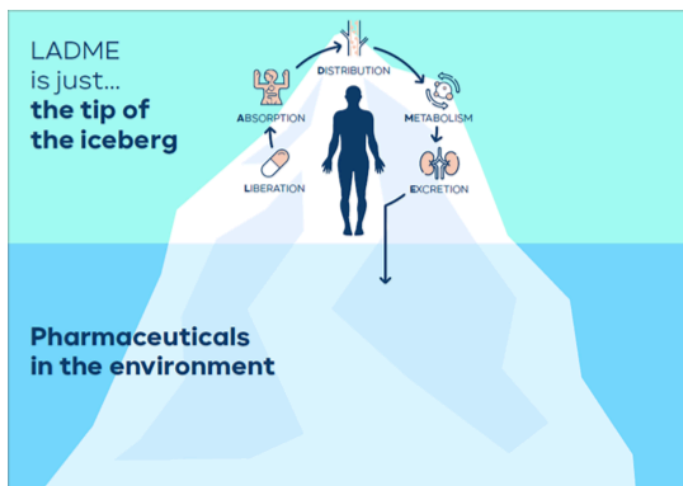


Figure 1 The liberation, absorption, distribution, metabolism, excretion scheme is just the tip of the iceberg. LADME: Liberation, absorption, distribution, metabolism, excretion.

Presence of drugs in environmental matrices

Residues of multiple types of drugs (about 700) have been detected in different environmental compartments mainly in wastewater, surface and groundwater, but also in soil, air and biota, even in the tap water that we drink[13]. In the specific case of psychiatric drugs, there are complete books reviewing their presence in the

environment[14]. Carbamazepine has even been considered as a marker for wastewater influenced water bodies due to its omnipresence[15].

For a greater detail of all the drugs detected in any environmental matrix, the free database of the German Environment Agency can be consulted, which maintains an exhaustive registry of all published studies, available from: <https://www.umweltbundesamt.de/dokument/database-pharmaceuticals-in-the-environment-excel>.

Furthermore, once they have reached the environment, parent drugs (or metabolites) continue to transform and continue to undergo complex metabolic processes by different organisms as well as by different physicochemical mechanisms (photodegradation, adsorption to solids, etc.), leading to “transformation compounds”. For example, Trawiński et al[16] reviewed the photodegradation process of psychotropic drugs. Some substances can remain unchanged in the environment for decades, i.e., are very persistent. This is the case of oxazepam, which has remained unchanged at the bottom of Swedish lakes for more than 30 years[17].

Ecotoxicological effects of psychiatric drugs

Toxic effects of drugs in the environment can go far beyond growth, mortality or reproduction. For example, psychoactive drugs can affect organism behaviour and fitness, altering population dynamics[18-21]. The therapeutic targets and the physiological systems in which drugs act are not exclusive to human beings. Many of these structures and signaling pathways are highly conserved phylogenetically, and are present in many living organisms[22]. For example, multiple behavioral tests (such as anxiety, fear and stress) for experimental drugs intended for human use are performed on fish[23]. Fish share many of the neurotransmitter and signaling pathways with us. In fact, biogenic monoamines (serotonin, dopamine, norepinephrine, etc.) are found in vertebrates and invertebrates, including amphibians, fish, insects and echinoderms[24,25]. These substances are so ancient from an evolutionary point of view that they are present in organisms outside the animal kingdom. For example, acetylcholine is present in fungi and bacteria[26] and serotonin in plants[27]. Fluoxetine has shown to induce behavioral changes in crickets[28]. Fish also become constipated in the presence of the antipsychotic clozapine[29], plants accumulate benzodiazepines that could act on their GABAergic system[30], or sertraline affects sedimentary nitrification processes by altering the microbial trophic chain[31].

Castillo-Zacarias *et al*[32] have recently reviewed available literature about the presence and effects of antidepressants on the environment. We have also shown that the role of antipsychotic drugs as environmental pollutants has probably been underrated so far[33].

In short, the psychoactive drugs that we use and excrete into the environment can have pharmacological effects in different non-target organisms. However, the extent of exposure and subsequent effects remains unknown for many taxa and ecosystems[34] (Table 1).

Effects of drug pollution on human health

The effect of drug pollution on human health is still relatively little studied. A WHO report published in 2012 concluded that drug concentrations in tap water should not pose any health problems[35]. These findings were confirmed in a recent study carried out in China[36]. However, the presence of drugs in the environment could be a problem for the most vulnerable groups of patients (e.g., allergic[5]). Although there is no evidence of

short-term effects on human health, uncertainties remain, in particular concerning long-term exposure (chronic exposure) to a mixture of pollutants[5]. The possible routes of exposure are, mainly, consumption of drinking water, vegetables and tubers, meat, fish, shellfish and dairy products[5].

Probably the best known example of the deleterious effect of drug pollution on human health is that of the increase in bacteria with resistance to antibiotics, which is currently recognized as the biggest public health problem worldwide. In this sense, we consider that the “One Health” approach or philosophy, which considers that human health is closely interrelated with environmental health, is essential[37]. Nevertheless, we believe that it is necessary to extend this approach to all therapeutic groups including psychiatric drugs, not only antibiotics[38,39].

Some authors have suggested that psychoactive drugs present in the environment may potentially be associated with human neuropsychiatric disorders such as autism, Alzheimer’s disease and schizophrenia, since they are able to cross the maternal barriers affecting the development of the embryonic brain[40].

Bioaccumulation

Recent studies suggest that certain drugs bioaccumulate in non-target organisms through the food web, reaching tissue concentrations much higher than those found in the environment. For example, a study carried out in five Australian rivers found that platypuses and brown trouts bioaccumulate 66 of the 80 drugs studied due to their insectivorous diet. First, the larvae of riparian insect’s bioaccumulated certain drugs present in surface waters, and subsequently, these drugs can pass to the animals that eat them. Surprisingly, the researchers estimated that, in the case of antidepressants, platypus might be exposed to amounts up to half the daily doses used in humans[41]. (Table 1).

A recent work studied the presence of more than 90 drugs pertaining to 23 different drug classes in blood plasma of wild European fish in three different European countries. For some drugs, measured fish plasma concentrations were above human therapeutic plasma concentrations. Indeed, three of the four drugs that showed a moderate or a high risk of inducing toxic effects on fish were antipsychotics: i.e., risperidone, flupentixol and haloperidol[42].

An excellent review of the bioaccumulation of pharmaceuticals (including psychiatric drugs) in aquatic fish and invertebrates was published by Miller et al[43]. Besides, this bioaccumulation process is not exclusively restricted to the aquatic environment. A study carried out in the Doñana National Park, Spain, showed that dung beetles accumulate the antiparasitic ivermectin used in livestock in their tissues. Ivermectin, with recognized insecticidal activity, is toxic to beetles that are in charge of processing manure, in such a way that the properties of the soil are altered[44]. In addition, some studies suggest certain psychiatric drugs like carbamazepine and fluoxetine might bioaccumulate in terrestrial organisms (earthworms) depending on the properties of the soil and the physico-chemical characteristics of the drug[45].

We still understand little about what is happening ... although highly hypothetical, what if insectivorous bats were accumulating drugs in their tissues? What consequences could this have on the appearance of new zoonosis[46]?

Environmental impact risk reports from the European Medicines Agency

Since October 2005, the European Medicines Agency has required the laboratories holding the marketing authorization to assess the environmental impact of medicines [47] (ERA:

Environmental risk assessment). Despite this significant progress, this report is not considered during the benefit-risk balance in drug evaluation, even if it shows potential risks for the environment. For example, the ERA of the recently marketed antidepressant vortioxetine[48] recognizes that this drug is “potentially harmful to the environment”. Something similar occurs with the antipsychotic asenapine[49], for which the ERA recognizes that it is a potential endocrine disruptor. Despite this, both drugs have been marketed without any restrictions.

Table 1 Examples of the presence of certain psychiatric drugs in the environment and ecotoxicological effects on organisms				
Therapeutic class	Drug	Non-target organism	Ecotoxicological effects	Ref.
Antiepileptics	Carbamazepine	Ryegrass (<i>Lolium perenne</i>)	Accumulation in plants tissues	Carter <i>et al</i> [83], 2014
Antidepressants	Various	Platypus (<i>Ornithorhynchus anatinus</i>), Brown Trout (<i>Salmo trutta</i>)	Half of human daily dose, insectivorous diet. Effects?	Richmond <i>et al</i> [41], 2018
	Sertraline	River sediment microorganisms	Sedimentary nitrification processes by altering the microbial trophic chain	Li <i>et al</i> [31], 2020
	Fluoxetine	Cricket (<i>Gryllus campestris</i>)	Behaviour disturbance	Abey-Lee <i>et al</i> [28], 2018
		Starling (<i>Sturnus vulgaris</i>)	Reduced female attractiveness	Whitlock <i>et al</i> [84], 2018
Benzodiazepines	Various	Beet (<i>Beta vulgaris</i>)	Phytotoxicity	Carter <i>et al</i> [30], 2018
	Oxazepam	European perch (<i>Perca fluviatilis</i>)	Behaviour and feeding rate disturbance	Brodin <i>et al</i> [85], 2013
Antipsychotics	Clozapine	Zebra fish (<i>Danio rerio</i>)	Constipation	de Alvarenga <i>et al</i> [29], 2017
	Risperidone	Zebra fish (<i>Danio rerio</i>)	Alteration of antipredatory behavior, transgenerational effect	Kalichak <i>et al</i> [86], 2019
	Various	Chub (<i>Squalius cephalus</i>)	Fish plasma concentrations > Human plasma therapeutic concentrations	Cervený <i>et al</i> [42], 2020

At the moment, and contrary to what happens for certain medicinal products for veterinary use, the environmental impact is not taken into account in the benefit/risk balance of the evaluation of medicinal products for human use, which is based solely on criteria of efficacy and safety. We believe that this may change in the future, as we gain knowledge on the environmental risks of medicines[38]. In addition, another aspect to consider is that all drugs marketed before that date (October 30, 2005) are exempt from submitting this environmental impact report in the renewal of their marketing authorization, so the information available about many of the drugs currently used is scarce or non-existent. For some drugs, such as fluoxetine, an ERA is published many decades after its authorization[50]. Another aspect is that current ecotoxicological tests demanded by the EMA do not include behavioral tests. Some authors propose updating the demanded tests in order to incorporate these kind of ecotoxicological tests[21]. Currently, the regulation of ERAs for medicines for human use is under review. It seems that some changes will occur, specifically in terms of bioaccumulation and fundamentally endocrine disruptors[51]. However, the legislation involved in Europe is varied, abundant, complex and not always easy to understand by non-experts in the field[52]. Another important issue is that legislation differs between countries, or is, directly, non-existent[53]. On the other hand, there are veterinary drugs used in pets, for which the environmental impact assessment is not considered in the benefit/risk balance either. There are authors who consider that this should change, taking into account the toxicity

of some of the substances used and the increasing number of pets in our environment[54,55].

POSSIBLE SOLUTIONS

The study of the problem of drug pollution is among the priority lines of research of the main organizations dedicated to the protection of public and environmental health, such as the WHO and the European Commission. In this regard, it is worth highlighting the publication of the “Strategic approach of the European Union in the field of pharmaceutical products in the environment” by the European authorities, probably the front-runners in the field[56].

The contamination of the environment with pharmaceutical products is a complicated and diffuse problem that entails scientific uncertainties, a large number of stakeholders with different values and interests, and great complexity. This is probably why the Dutch government has classified it as a “wicked problem” (a problem that is difficult or impossible to solve given that it presents incomplete, contradictory and changing requirements that are generally difficult to recognize). In their comprehensive strategy to face the problem, they have established that all agents involved in the complex life cycle of the drug should participate in the solution[57].

It is more than likely that in the future, as the detection of drugs and ecotoxicological studies progress, many drugs will end up being a priority in legislative matters, and that maximum concentration of certain drugs in wastewater may be established. We believe that we are on the verge of a revolution in the field of psychopharmacology[38].

At source measures

Before trying to improve the elimination processes of drugs once they reach the WWTP and the environment, it is probably reasonable to act at source. Considering that drugs have offered, and continue to offer, an unquestionable benefit to the health of humanity, great care must be taken not to restrict access to those drugs that are necessary. Here are some ideas that could help improve the problem.

Rational use of the drug, eco-prescription, or "green prescription"

The “Rational use of medicines” is a term coined by WHO experts more than 30 years ago, in 1985[58]. To date, the rational use of medicine has been defined as “patients receive the appropriate medication for their clinical needs, in the doses corresponding to their individual requirements, for an adequate period of time and at the lowest possible cost for them and for the community”. This term has served as a conceptual framework of undoubted value to promote actions and strategies that have improved the health of countless patients, avoiding excesses in the use of medications, polypharmacy, etc. However, we believe that the term requires an update, so that the "One Health's philosophy, which tries to achieve optimal health for people, animals and our environment taking into account the existing interrelations, is considered[59]. Currently this philosophy is already applied, but fundamentally to antimicrobials. We believe that broadening the approach is necessary. Reducing the inappropriate consumption of drugs will reduce their entry into ecosystems, improving people's health and that of the environment[60].

Christian Daughton, head of the American Environment Agency, now retired, proposed more than 5 years ago the term “eco-prescription”, or “green prescription”.

Ultimately, it means that the prescriber should consider the characteristics and environmental behavior of drugs when prescribing them[10]. This is definitely going to be challenging. For example, oxazepam (not available in some countries such as Spain, but a common metabolite of numerous benzodiazepines commonly used in our setting), is considered a good choice for the elderly due to its adequate pharmacokinetic profile, since it is not eliminated by oxidative metabolism and is excreted unchanged in urine. However, it is known to cause potential toxic effects in fish, and can accumulate for decades without biodegrading. From an environmental point of view, substances that are metabolized to inactive metabolites prior to elimination may be preferable[10]. We believe that incorporating environmental criteria in the use of medicines is essential, and it may become a true revolution in pharmacotherapeutics [38].

Another interesting classification of drugs is the one proposed by the Swedish Environmental Research Institute. It is one of the few available classifications of drugs according to their environmental characteristics. It is an initiative of the Stockholm City Council, driven by the pharmaceutical industry. Each drug receives three scores, each of which can take a value from 0 to 3: one on its persistence in the environment (P); another on bioaccumulation (B) and another on toxicity (T). The overall score is the sum of the points obtained for each item[61].

Prescribers may incorporate this information when using drugs in individual patients. The “Wise List” (Kloka Listan), is so far, the only multifaceted approach incorporating environmental aspects to recommend drugs in ambulatory care[62]. The chain approach of the Dutch Government also incorporates a “psychotropic task force” in order to reduce psychotropics in water[57]. We believe further research is urgently needed in this crucial area.

The design of more biodegradable and sustainable drug: “Green design”

An attractive idea for the future is to design greener and more biodegradable drugs; i.e. “benign by design” concept[63]. Although there are already some examples of the development of more “environmentally friendly” drugs, such as glufosfamide[64] and green drug delivery systems[65], no psychoactive drugs have been designed to be more biodegradable.

Furthermore, a holistic approach should be considered when evaluating the environmental impact of medicines, and other constituent parts of medicines ought to be taken into account apart from active pharmaceutical ingredients. We believe there is room for improvement in this specific area. For example, inhaled loxapine, a recently marketed antipsychotic for the treatment of agitation, requires a lithium battery for each dose administered. Another example would be Abilify Mycite®, in which an electronic circuit is excreted with each capsule administered[38].

Education

Until now, healthcare professionals who are in charge of prescribing, administering and dispensing drugs have paid little attention to the problem of drug contamination, which has been preferentially addressed by biologists, chemists and other professional profiles such as environmentalists. We firmly believe that this concern cannot be ignored anymore in the schools of Medicine, Pharmacy and Nursing[66]. Recent studies carried out in China have shown that awareness of the problem in both pharmacists[67] and prescribers[72] has a wide room for improvement. As proposed in the European

Commission strategy[56], we believe that general education for both health professionals and citizens is a key element in the fight against drug pollution.

Improved waste management, responsible consumption

The incorrect management of pharmaceutical waste is one of the routes of entry of medicines into the environment. Studies indicate that up approximately 33% of patients do not use all the medicines dispensed, which generates a waste of health resources and possible environmental contamination[2]. The generalization of the adoption of refund schemes such as SIGRE, implemented in Spain, will be another key element. This is especially important in countries where waste management is not working well and where inappropriate drug disposal can be expected, such as regions from the Middle East, Asian and African countries[69]. Optimizing package sizes and extending drug expiration dates where possible will allow drugs that are still safe to use from being unnecessarily discarded. The idea of reusing drugs has also been proposed. In this regard, a survey conducted in the United Kingdom found that more than half of those surveyed would welcome the reuse of medicines in the future[70]. Although it is not legally accepted in many countries, it could help reduce the amount of unused medicine accumulation, a fact that can lead to overuse or incorrect use of medicines or also to incorrect disposal. However, obviously, considering security issues is mandatory if such policies are going to be implemented.

From a regulatory perspective, the European Parliament suggests that “eco-labeling” of pharmaceutical products with a high risk for the environment should be explored (Figure 2), as is already done with other products in the market[71].

Legislation

As knowledge about the environmental impact of pharmaceuticals keeps mounting up, ERAs need to update accordingly to improve our capability of correctly assessing the risk posed. It is interesting to highlight that last year, venlafaxine and desvenlafaxine were considered as suitable for inclusion in the next “Watch List” (WL): under the European Union Water Framework Directive[72]. These antidepressants are the first psychoactive drugs ever to be included in such a list[73].

End of pipe measures

Apart from implementing at source measures, it is essential to address the problem of waste already generated. Taking into account the growing consumption of drugs at a global level, the research and development of new purification systems (biological, physico-chemical) that eliminate these residues efficiently and at a sustainable cost should be a priority.

Improvement of WWTPs

The design of purification systems requires prior knowledge of the physical-chemical characteristics of the effluent wastewater and of the concentration of the main eliminated drugs, especially those that represent a greater risk for the environment.

For example, in order to optimize costs, various authors propose eliminating drugs at the hospital wastewater effluent instead of treating the total amount of water reaching WWTPs, since hospitals are the main consumers of certain types of pharmaceuticals (some cytostatics, broad-spectrum antibiotics, iodine contrasts). There are already interesting initiatives such as the one implemented at the Herlev Hospital in Copenhagen,

Denmark, where improved treatment of hospital wastewater is performed on-site to effectively remove all drugs before they reach the municipal WWTP[74].

Another strategy is that carried out by Switzerland, a country in which all treatment plants from a certain size are going to be improved (through tertiary treatment with ozone and activated carbon) to effectively eliminate drugs and other emerging contaminants, at an approximate cost of 1 billion euros[75]. However, this strategy is probably not sustainable or applicable to most countries. On the other hand, ozonation can oxidize drugs producing new transformation products with poor known ecotoxicological effects[76].

New methods that improve the performance of WWTPs in the elimination of drugs continue to be studied and sought. A curious method is the use of xylophagous fungi (white rot fungi) of which the species most used to date is *Trametes versicolor*. These fungi, in charge of degrading soil organic matter in nature, possess enzymes, called “laccases” with the capacity to oxidize a wide spectrum of organic substances, including drugs[77].

Eco-pharmacovigilance, environmental pharmacovigilance

In the 1960s, the use of thalidomide was used for the treatment of nausea and vomiting in pregnant women. Later, the drug proved to be teratogenic, producing thousands of newborns malformations. This disaster gave rise to the modern pharmacovigilance systems currently in place. Since the ecological disaster produced by diclofenac in the Indian subcontinent, various authors have asked to create a new discipline, i.e., “Eco-pharmacovigilance” or “environmental pharmacovigilance”[78]. This discipline will dedicate to “monitor” the environmental impact of drugs[79]. Will be ever witness a market withdrawal of an antidepressant or an antipsychotic, or any other drug, because of environmental factors in the future? May be.

Phytoremediation

From the point of view of environmental drug contamination, the accumulation of drugs by plants can be harmful (in the case of agriculture) or beneficial, if done on purpose. Phytoremediation is a technology that uses plants and the associated microorganisms of the rhizosphere (zone of interaction between plant roots and soil microorganisms) to eliminate, transform or contain toxic chemicals located in soils, sediments, groundwater and surface waters, among others. Different species of plants have been used for the treatment or removal of a variety of pollutants such as oil, chlorinated solvents, pesticides, metals, radionuclides, explosives and pharmaceuticals [80]. The design of constructed wetlands, a technique that can be employed for the removal of pharmaceuticals from wastewater, has received particular attention[81]. It is interesting to verify that the detoxification mechanisms used by plants, are sometimes surprisingly similar to those of mammals, as in the case of glutathione conjugation of paracetamol in the *Brassica juncea* plant[82].

CONCLUSION

So far, the problem of drug pollution has been largely ignored by healthcare professionals and academics. However, if the problem is to be dealt with effectively, an interdisciplinary approach will be necessary, allowing integration of the knowledge of the different agents involved[38].

In conclusion, drug pollution with psychiatric drugs is a problem of emerging concern. This complex problem involves many stakeholders with different values and interests. Solutions can be implemented at source, before drugs reach the environment: using medicines more rationally, prescribing greener drugs, or designing pharmaceuticals that are more easily biodegradable. Besides, end of pipe measures, such as the development of new, sustainable purification systems will also be crucial. Finally, educating both health professionals and citizens, and collaboration between environmental and healthcare sciences is going to be essential.

REFERENCES

- 1 Daughton CG. Pharmaceuticals and the Environment (PiE): Evolution and impact of the published literature revealed by bibliometric analysis. *Sci Total Environ* 2016; 562: 391-426 [PMID: 27104492 DOI: 10.1016/j.scitotenv.2016.03.109]
- 2 Organisation for Economic Co-operation and Development (OECD). Pharmaceutical Residues in Freshwater Hazards and Policy Responses. [cited 8 October 2020]. Available from: <https://www.oecd.org/publications/pharmaceutical-residues-in-freshwater-c936f42d-en.htm>
- 3 IMS institute. Global Medicines in 2020. [cited 8 October 2020]. Available from: <https://www.iqvia.com/-/media/iqvia/pdfs/institute-reports/global-medicines-use-in-2020>
- 4 The Guardian. Antidepressant drug use in UK. [cited January 4, 2021]. Available from: <https://www.theguardian.com/society/2021/jan/01/covid-antidepressant-use-at-all-time-high-as-access-to-counselling-in-england-plunges>
- 5 BIO Intelligence Service. Study on the environmental risks of medicinal products. Final report prepared for Executive Agency for Health and Consumers. 2013. [cited 7 October 2020]. Available from: https://ec.europa.eu/health/sites/health/files/files/environment/study_environment.pdf
- 6 Larsson DG. Pollution from drug manufacturing: review and perspectives. *Philos Trans R Soc Lond B Biol Sci* 2014; 369 [PMID: 25405961 DOI: 10.1098/rstb.2013.0571]
- 7 Gasser G, Pankratov I, Elhanany S, Werner P, Gun J, Gelman F, Lev O. Field and laboratory studies of the fate and enantiomeric enrichment of venlafaxine and O-desmethylenlafaxine under aerobic and anaerobic conditions. *Chemosphere* 2012; 88: 98-105 [PMID: 22445391 DOI: 10.1016/j.chemosphere.2012.02.074]
- 8 Poustie A, Yang Y, Verburg P, Pagilla K, Hanigan D. Reclaimed wastewater as a viable water source for agricultural irrigation: A review of food crop growth inhibition and promotion in the context of environmental change. *Sci Total Environ* 2020; 739: 139756 [PMID: 32540653 DOI: 10.1016/j.scitotenv.2020.139756]
- 9 Comber S, Gardner M, Sörme P, Leverett D, Ellor B. Active pharmaceutical ingredients entering the aquatic environment from wastewater treatment works: A cause for concern? *Sci Total Environ* 2018; 613-614: 538-547
- 10 Daughton CG. Eco-directed sustainable prescribing: feasibility for reducing water contamination by drugs. *Sci Total Environ* 2014; 493: 392-404 [PMID: 24956075 DOI: 10.1016/j.scitotenv.2014.06.013]

- 11 United Nations. World Water Assessment Programme (UNESCO WWP). [cited 7 October 2020]. Available from: <http://www.unesco.org/new/es/natural-sciences/environment/water/wwap/wwdr/>
- 12 Fekadu S, Alemayehu E, Dewil R, Van der Bruggen B. Pharmaceuticals in freshwater aquatic environments: A comparison of the African and European challenge. *Sci Total Environ* 2019; 654: 324-337 [PMID: 30448654 DOI: 10.1016/j.scitotenv.2018.11.072]
- 13 Weber F. Pharmaceuticals in the environment - The global perspective: Occurrence, effects, and potential cooperative action under SAICM. 2014. German Federal Environmental Agency. [cited 29 October 2020]. Available from: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/pharmaceuticals_in_the_environment_0.pdf
- 14 Silva B, Costa F, Neves IC, Tavares T. Psychiatric Pharmaceuticals as Emerging Contaminants in Wastewater. 2015. [DOI: 10.1007/978-3-319-20493-2]
- 15 Hai FI, Yang S, Asif MB, Sencadas V, Shawkat S, Sanderson-Smith M, Gorman J, Xu ZQ, Yamamoto K. Carbamazepine as a Possible Anthropogenic Marker in Water: Occurrences, Toxicological Effects, Regulations and Removal by Wastewater Treatment Technologies. *Water* 2018; 10: 107 [DOI: 10.3390/w10020107]
- 16 Trawiński J, Skibiński R. Studies on photodegradation process of psychotropic drugs: a review. *Environ Sci Pollut Res Int* 2017; 24: 1152-1199 [PMID: 27696160 DOI: 10.1007/s11356-016-7727-5]
- 17 Klaminder J, Brodin T, Sundelin A, Anderson NJ, Fahlman J, Jonsson M, Fick J. Long-Term Persistence of an Anxiolytic Drug (Oxazepam) in a Large Freshwater Lake. *Environ Sci Technol* 2015; 49: 10406-10412 [PMID: 26196259 DOI: 10.1021/acs.est.5b01968]
- 18 Ford AT. From gender benders to brain benders (and beyond! *Aquat Toxicol* 2014; 151: 1-3 [PMID: 24613286 DOI: 10.1016/j.aquatox.2014.02.005]
- 19 Brodin T, Piovano S, Fick J, Klaminder J, Heynen M, Jonsson M. Ecological effects of pharmaceuticals in aquatic systems--impacts through behavioural alterations. *Philos Trans R Soc Lond B Biol Sci* 2014; 369 [PMID: 25405968 DOI: 10.1098/rstb.2013.0580]
- 20 Gilbert N. Drug waste harms fish. *Nature* 2011; 476: 265 [PMID: 21850080 DOI: 10.1038/476265a]
- 21 Ågerstrand M, Arnold K, Balshine S, Brodin T, Brooks BW, Maack G, McCallum ES, Pyle G, Saaristo M, Ford AT. Emerging investigator series: use of behavioural endpoints in the regulation of

chemicals Environ. Environ Sci Processes Impacts 2020; 22: 49-65 [DOI: 10.1039/C9EM00463G]

22 Gunnarsson L, Jauhiainen A, Kristiansson E, Nerman O, Larsson DG. Evolutionary conservation of human drug targets in organisms used for environmental risk assessments. *Environ Sci Technol* 2008;

42: 5807-5813 [PMID: 18754513 DOI: 10.1021/es8005173]

23 Stewart A, Wu N, Cachat J, Hart P, Gaikwad S, Wong K, Utterback E, Gilder T, Kyzar E, Newman

A, Carlos D, Chang K, Hook M, Rhymes C, Caffery M, Greenberg M, Zadina J, Kalueff AV. Pharmacological modulation of anxiety-like phenotypes in adult zebrafish behavioral models. *Prog Neuropsychopharmacol Biol Psychiatry* 2011; 35: 1421-1431 [PMID: 21122812 DOI: 10.1016/j.pnpbp.2010.11.035]

24 Bauknecht P, Jékely G. Ancient coexistence of norepinephrine, tyramine, and octopamine signaling in bilaterians. *BMC Biol* 2017; 15: 6 [PMID: 28137258 DOI: 10.1186/s12915-016-0341-7]

25 Turlejski K. Evolutionary ancient roles of serotonin: long-lasting regulation of activity and development. *Acta Neurobiol Exp (Wars)* 1996; 56: 619-636 [PMID: 8768313]

26 Horiuchi Y, Kimura R, Kato N, Fujii T, Seki M, Endo T, Kato T, Kawashima K. Evolutional study on acetylcholine expression. *Life Sci* 2003; 72: 1745-1756 [PMID: 12559395 DOI: 10.1016/s0024-3205(02)02478-5]

27 Mukherjee S. Novel perspectives on the molecular crosstalk mechanisms of serotonin and melatonin in plants. *Plant Physiol Biochem* 2018; 132: 33-45 [PMID: 30172851 DOI: 10.1016/j.plaphy.2018.08.031]

28 Abbey-Lee RN, Uhrig EJ, Garnham L, Lundgren K, Child S, Løvlie H. Experimental manipulation of monoamine levels alters personality in crickets. *Sci Rep* 2018; 8: 16211 [PMID: 30385805 DOI: 10.1038/s41598-018-34519-z]

29 de Alvarenga KAF, Sacramento EK, Rosa DV, Souza BR, de Rezende VB, Romano-Silva MA. Effects of antipsychotics on intestinal motility in zebrafish larvae. *Neurogastroenterol Motil* 2017; 29 [PMID: 27981679 DOI: 10.1111/nmo.13006]

30 Carter LJ, Williams M, Martin S, Kamaludeen SPB, Kookana RS. Sorption, plant uptake and metabolism of benzodiazepines. *Sci Total Environ* 2018; 628-629: 18-25 [PMID: 29428856 DOI: 10.1016/j.scitotenv.2018.01.337]

31 Li Y, Miao Y, Zhang W, Yang N, Niu L, Zhang H, Wang L. Sertraline inhibits top-down forces (predation) in microbial food web and promotes nitrification in sediment. *Environ Pollut* 2020; 267: 115580 [PMID: 33254665 DOI: 10.1016/j.envpol.2020.115580]

32 Castillo-Zacarias C, Barocio ME, Hidalgo-Vázquez E, Sosa-Hernández JE, Parra-Arroyo L, López-Pacheco IY, Barceló D, Iqbal HNM, Parra-Saldívar R. Antidepressant drugs as emerging contaminants: Occurrence in urban and non-urban waters and analytical methods for their detection. *Sci Total Environ* 2021; 757: 143722 [PMID: 33221013 DOI: 10.1016/j.scitotenv.2020.143722]

33 Escudero J, Muñoz JL, Morera-Herreras T, Hernandez R, Medrano J, Domingo-Echaburu S, Barceló D, Orive G, Lertxundi U. Antipsychotics as environmental

pollutants: An underrated threat? *Sci Total Environ* 2021; 769: 144634 [PMID: 33485196 DOI: 10.1016/j.scitotenv.2020.144634]

34 Arnold KE, Brown AR, Ankley GT, Sumpter JP. Medicating the environment: assessing risks of pharmaceuticals to wildlife and ecosystems. *Philos Trans R Soc Lond B Biol Sci* 2014; 369 [PMID: 25405959 DOI: 10.1098/rstb.2013.0569]

35 World Health Organization. Pharmaceuticals in drinking water. [cited 29 October 2020]. Available from: https://www.who.int/water_sanitation_health/publications/2012/pharmaceuticals/en/

36 Wang Z, Gao S, Dai Q, Zhao M, Yang F. Occurrence and risk assessment of psychoactive substances in tap water from China. *Environ Pollut* 2020; 261: 114163 [PMID: 32078882 DOI: 10.1016/j.envpol.2020.114163]

37 Amuasi JH, Lucas T, Horton R, Winkler AS. Reconnecting for our future: The Lancet One Health Commission. *Lancet* 2020; 395: 1469-1471 [DOI: 10.1016/S0140-6736(20)31027-8]

38 Lertxundi U, Hernández R, Medrano J, Orive G. Drug pollution and pharmacotherapy in psychiatry: A "platypus" in the room. *Eur Psychiatry* 2020; 63: e33 [PMID: 32200774 DOI: 10.1192/j.eurpsy.2020.32]

39 Domingo-Echaburu S, Orive G, Lertxundi U. Ivermectin & COVID-19: Let's keep a One Health perspective. *Sustain Chem Pharm* 2021; 21: 100438 [PMID: 33898692 DOI: 10.1016/j.scp.2021.100438]

40 Kaushik G, Thomas MA. The potential association of psychoactive pharmaceuticals in the environment with human neurological disorders. *Sustain Chem Pharm* 2019; 13 [PMID: 31453309 DOI: 10.1016/j.scp.2019.100148]

41 Richmond EK, Rosi EJ, Walters DM, Fick J, Hamilton SK, Brodin T, Sundelin A, Grace MR. A diverse suite of pharmaceuticals contaminates stream and riparian food webs. *Nat Commun* 2018; 9: 4491 [PMID: 30401828 DOI: 10.1038/s41467-018-06822-w]

42 Cervený D, Grabic R, Grabicová K, Randák T, Larsson DGJ, Johnson AC, Jürgens MD, Tysklind M, Lindberg RH, Fick J. Neuroactive drugs and other pharmaceuticals found in blood plasma of wild European fish. *Environ Int* 2020; 146: 106188 [DOI: 10.1016/j.envint.2020.106188]

43 Miller TH, Bury NR, Owen SF, MacRae JJ, Barron LP. A review of the pharmaceutical exposome in aquatic fauna. *Environ Pollut* 2018; 239: 129-146 [PMID: 29653304 DOI: 10.1016/j.envpol.2018.04.012]

44 Verdú JR, Cortez V, Ortiz AJ, Lumaret JP, Lobo JM, Sánchez-Piñero F. Biomagnification and body distribution of ivermectin in dung beetles. *Sci Rep* 2020; 10: 9073 [PMID: 32493927 DOI: 10.1038/s41598-020-66063-0]

45 Carter LJ, Ryan JJ, Boxall ABA. Effects of soil properties on the uptake of pharmaceuticals into earthworms. *Environ Pollut* 2016; 213: 922-931 [PMID: 27049789 DOI: 10.1016/j.envpol.2016.03.044]

46 Orive G, Lertxundi U. Virus, bats and drugs. *Rev Environ Health* 2020; 35: 301-302 [PMID: 32829320 DOI: 10.1515/reveh-2020-0083]

- 47 European Medicines Agency. Environmental risk assessment of medicinal products for human use. [cited 28 October 2020]. Available from: <https://www.ema.europa.eu/en/environmental-risk-assessment-medicinal-products-human-use>
- 48 Brintelix® (vortioxetina). European Public Assessment Report. [cited 8 October 2020]. Available from: https://www.ema.europa.eu/en/documents/assessment-report/brintelix-epar-public-assessment-report_en.pdf
- 49 Sycrest® (asenapina). European Public Assessment Report. [cited 8 October 2020]. Available from: European Public Assessment Report
- 50 Oakes KD, Coors A, Escher BI, Fenner K, Garric J, Gust M, Knacker T, Küster A, Kussatz C, Metcalfe CD, Monteiro S, Moon TW, Mennigen JA, Parrott J, Péry AR, Ramil M, Roennefahrt I, Tarazona JV, Sánchez-Argüello P, Ternes TA, Trudeau VL, Boucard T, Van Der Kraak GJ, Servos MR. Environmental risk assessment for the serotonin re-uptake inhibitor fluoxetine: Case study using the European risk assessment framework. *Integr Environ Assess Manag* 2010; 6 Suppl: 524-539 [PMID: 20821717 DOI: 10.1002/ieam.77]
- 51 European Medicines Agency. Environmental risk assessment of medicinal products for human use. Review Draft. [cited 7 October 2020]. Available from: <https://www.ema.europa.eu/en/environmental-risk-assessment-medicinal-products-human-use>
- 52 Wess RA. Update of EMA's Guideline on the Environmental Risk Assessment (ERA) of Medicinal Products for Human Use. *Ther Innov Regul Sci* 2021; 55: 309-323 [PMID: 32996106 DOI: 10.1007/s43441-020-00216-1]
- 53 Jose J, Sandra Pinto J, Kotian B, Mathew Thomas A, Narayana Charyulu R. Comparison of the regulatory outline of ecopharmacovigilance of pharmaceuticals in Europe, USA, Japan and Australia. *Sci Total Environ* 2020; 709: 134815 [PMID: 31887508 DOI: 10.1016/j.scitotenv.2019.134815]
- 54 Little CJ, Boxall AB. Environmental pollution from pet parasiticides. *Vet Rec* 2020; 186: 97 [DOI: 10.1136/vr.m110]
- 55 Domingo-Echaburu S, Lertxundi U, Boxall ABA, Orive G. Environmental contamination by pet pharmaceuticals: A hidden problem. *Sci Total Environ* 2021; 788: 147827 [PMID: 34134354 DOI: 10.1016/j.scitotenv.2021.147827]
- 56 European Commission. European Union Strategic Approach to Pharmaceuticals in the Environment. [cited 22 September 2020]. Available from: https://ec.europa.eu/info/Law/better-regulation/initiatives/ares-2017-2210630_en
- 57 Government of the Netherlands. Reducing Pharmaceutical Residues in Water: A Chain Approach. [cited 7 March 2020]. Available from: <https://www.government.nl/documents/policy-notes/2019/02/12/reducing-pharmaceutical-residues-in-water-achain-approach>
- 58 World Health Organization. Rational Use of Medicines. [cited 29 October 2020]. Available from: http://www.who.int/medicines/areas/rational_use/en/index.html
- 59 Orive G, Domingo-Echaburu S, Lertxundi U. Redefining “rational use of medicines”. *Sustainable Chemistry and Pharmacy* [DOI: 10.1016/j.scp.2021.100381]

- 60 Lertxundi U, Domingo-Echaburu S, Orive G. Rational use of drugs as a source control measure to fight drug pollution. *J Hazard Mater* 2021; 410: 124664 [PMID: 33272727 DOI: 10.1016/j.jhazmat.2020.124664]
- 61 Swedish Environmental Research Institute. Environmentally Classified Pharmaceuticals. [cited 9 December 2020]. Available from: <https://politiquedesante.fr/wp-content/uploads/2014/05/PBT-2014-2015-copie.pdf>
- 62 Gustafsson LL, Wettermark B, Godman B, Andersén-Karlsson E, Bergman U, Hasselström J, Hensjö LO, Hjemdahl P, Jägre I, Julander M, Ringertz B, Schmidt D, Sjöberg S, Sjöqvist F, Stiller CO, Törnqvist E, Tryselius R, Vitols S, von Bahr C; Regional Drug Expert Consortium. The 'wise list'- a comprehensive concept to select, communicate and achieve adherence to recommendations of essential drugs in ambulatory care in Stockholm. *Basic Clin Pharmacol Toxicol* 2011; 108: 224-233 [PMID: 21414143 DOI: 10.1111/j.1742-7843.2011.00682.x]
- 63 Leder C. Putting benign by design into practice-novel concepts for green and sustainable pharmacy:
Designing green drug derivatives by non-targeted synthesis and screening for biodegradability.
Sustainable Chem Pharm 2015; 2: 31-36 [DOI: 10.1016/j.scp.2015.07.001]
- 64 Banik BK. In *Advances in Green Chemistry, Green Approaches in Medicinal Chemistry for Sustainable Drug Design*. Elsevier 2020 [DOI: 10.1016/B978-0-12-817592-7.09998-6]
- 65 Dai L, Liu K, Si C, Wang L, Liu J, He J, Lei J. Ginsenoside nanoparticle: a new green drug delivery system. *J Mater Chem B* 2016; 4: 529-538 [PMID: 32263216 DOI: 10.1039/c5tb02305j]
- 66 Lertxundi U, Domingo-Echaburu S, Orive G. It's about time healthcare professionals and academics start thinking about drug pollution. *Sustainable Chem Pharm* 2020 [DOI: 10.1016/j.scp.2020.100278]
- 67 Liu J, Wang J, Hu XM. Knowledge, perceptions, and practice of ecopharmacovigilance among pharmacy professionals in China. *Environ Monit Assess* 2017; 189: 552 [PMID: 29022189 DOI: 10.1007/s10661-017-6289-4]
- 68 Wang J, Li S, He B. Chinese physicians' attitudes toward eco-directed sustainable prescribing from the perspective of ecopharmacovigilance: a cross-sectional study. *BMJ Open* 2020; 10: e035502 [PMID: 32487575 DOI: 10.1136/bmjopen-2019-035502]
- 69 Paut Kusturica M, Tomas A, Sabo A. Disposal of Unused Drugs: Knowledge and Behavior Among

People Around the World. *Rev Environ Contam Toxicol* 2017; 240: 71-104 [PMID: 27115675 DOI:

10.1007/398_2016_3]

70 Alhamad H, Patel N & Donyai P. Beliefs and intentions towards reusing medicines in the future: a

large-scale, cross-sectional study of patients in the UK. *Int J Pharm Pract* 2018; 26 Suppl 1: 12 [DOI:

10.1111/ijpp.12442]

71 European Parliament. [cited 7 October 2020]. Available from:

https://www.europarl.europa.eu/doceo/document/TA-9-2020-0226_EN.pdf

72 Gomez Cortes L, Marinov D, Sanseverino I. Selection of substances for the 3rd Watch List under the Water Framework Directive, EUR 30297 EN, Publications Office of the European Union, Luxembourg, 2020

73 Lertxundi U, Domingo-Echaburu S, Hernandez R, Medrano J, Orive G. Venlafaxine and desvenlafaxine to be included in the surface water Watch List. *Aust N Z J Psychiatry* 2021; 4867421998787 [PMID: 33636994 DOI: 10.1177/0004867421998787]

74 Herlev's hospital wastewater treatment. [cited 8 October 2020]. Available from: <https://nordiclifescience.org/nordic-solutions-for-handling-pharma-waste/>

75 Swiss Federal Institute of Aquatic Science and Technology (EAWAG). [cited 8 October 2020]. Available from: <https://www.eawag.ch/en/>

76 Bourgin M, Beck B, Boehler M, Borowska E, Fleiner J, Salhi E, Teichler R, von Gunten U, Siegrist H, McArdell CS. Evaluation of a full-scale wastewater treatment plant upgraded with ozonation and biological post-treatments: Abatement of micropollutants, formation of transformation products and oxidation by-products. *Water Res* 2018; 129: 486-498 [PMID: 29190578 DOI: 10.1016/j.watres.2017.10.036]

77 Cruz Del Álamo A, Pariente MI, Martínez F, Molina R. Trametes versicolor immobilized on rotating biological contactors as alternative biological treatment for the removal of emerging concern micropollutants. *Water Res* 2020; 170: 115313 [PMID: 31770646 DOI: 10.1016/j.watres.2019.115313]

78 Kühler TC, Andersson M, Carlin G, Johnsson A, Akerblom L. Do biological medicinal products pose a risk to the environment? *Drug Saf* 2009; 32: 995-1000 [PMID: 19810773 DOI: 10.2165/11316540-000000000-00000]

79 Manuel Gómez-Oliván L. Ecopharmacovigilance: Multidisciplinary Approaches to Environmental Safety of Medicines. *The Handbook of Environmental Chemistry*. Springer, 2019

80 Susarla S, Medina VF, McCutcheon SC (2002) Phytoremediation: an ecological solution to organic chemical contamination.

Ecol Eng 2002; 18: 647–658 [DOI: 10.1016/S0925-8574(02)00026-5]

81 Carvalho PN, Basto MC, Almeida CM, Brix H. A review of plant-pharmaceutical interactions: from uptake and effects in crop plants to phytoremediation in constructed wetlands. *Environ Sci Pollut Res Int* 2014; 21: 11729-11763 [PMID: 24481515 DOI: 10.1007/s11356-014-2550-3]

- 82 Bartha B, Huber C, Harpaintner R, Schröder P. Effects of acetaminophen in *Brassica juncea* L. Czern.: investigation of uptake, translocation, detoxification, and the induced defense pathways. *Environ Sci Pollut Res Int* 2010; 17: 1553-1562 [PMID: 20574781 DOI: 10.1007/s11356-010-0342-y]
- 83 Carter LJ, Harris E, Williams M, Ryan JJ, Kookana RS, Boxall AB. Fate and uptake of pharmaceuticals in soil-plant systems. *J Agric Food Chem* 2014; 62: 816-825 [DOI: 10.1021/jf404282y]
- 84 Whitlock SE, Pereira MG, Shore RF, Lane J, Arnold KE. Environmentally relevant exposure to an antidepressant alters courtship behaviours in a songbird. *Chemosphere* 2018; 211: 17-24 [PMID: 30071429 DOI: 10.1016/j.chemosphere.2018.07.074]
- 85 Brodin T, Fick J, Jonsson M, Klaminder J. Dilute concentrations of a psychiatric drug alter behavior of fish from natural populations. *Science* 2013; 339: 814-815 [PMID: 23413353 DOI: 10.1126/science.1226850]
- 86 Kalichak F, de Alcantara Barcellos HH, Idalencio R, Koakoski G, Soares SM, Pompermaier A, Rossini M, Barcellos LJG. Persistent and transgenerational effects of risperidone in zebrafish. *Environ Sci Pollut Res Int* 2019; 26: 26293-26303 [PMID: 31286368 DOI: 10.1007/s11356-019-05890-9]
-

Previously published as: Argaluz, Julene, *et al.* "Environmental pollution with psychiatric drugs." *World Journal of Psychiatry* 11, no. 10 (2021): 791-804.

Antidepressant Drugs as Emerging Contaminants: Occurrence in Urban and Non-Urban Waters and Analytical Methods for their Detection

by Carlos Castillo-Zacarias *et al.*

Abstract

Antidepressants are drugs with a direct action on the brain's biochemistry through their interaction with the neurotransmitters, such as dopamine, norepinephrine, and serotonin. The increasing worldwide contamination from these drugs may be witnessed through their increasing presence in the urban water cycle. Furthermore, their occurrence has been detected in non-urban water, such as rivers and oceans. Some endemic aquatic animals, such as certain fish and mollusks, have bioaccumulated different antidepressant drugs in their tissues. This problem will increase in the years to come because the present COVID-19 pandemic has increased the general worldwide occurrence of depression and anxiety, triggering the consumption of antidepressants and, consequently, their presence in the environment. This work provides information on the occurrence of the most administrated antidepressants in urban waters, wastewater treatment plants, rivers, and oceans. Furthermore, it provides an overview of the analytical approaches currently used to detect each antidepressant presented. Finally, the ecotoxicological effect of antidepressants on several *in vivo* models are listed. Considering the information provided in this review, there is an urgent need to test the presence of antidepressant members of the monoamine oxidase inhibitors (MAOI) and tricyclic antidepressants (TCA) groups. Furthermore, incorporating new degradation/immobilization technologies in wastewater treatment plants (WWTPs) will be useful to stop the increasing occurrence of these drugs in the environment.

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1. Introduction

Emerging contaminants have currently received interest from regulatory organisms worldwide due to their detection in different water bodies. Human pharmaceuticals are included in the list of emerging contaminants from the UNESCO. Their detection and elimination were incorporated in the 2030 Agenda for Sustainable Development Goal Targets (UNESCO, 2020; Ramirez-Mendoza *et al.*, 2020). Psychiatric pharmaceuticals are a group of organic compounds used to treat mental illness (Wang *et al.*, 2020). Recently, several researchers have detected their presence in different countries at high and low concentrations (in the orders of magnitude from ng L⁻¹ to mg L⁻¹, respectively) (Silva *et al.*, 2015).

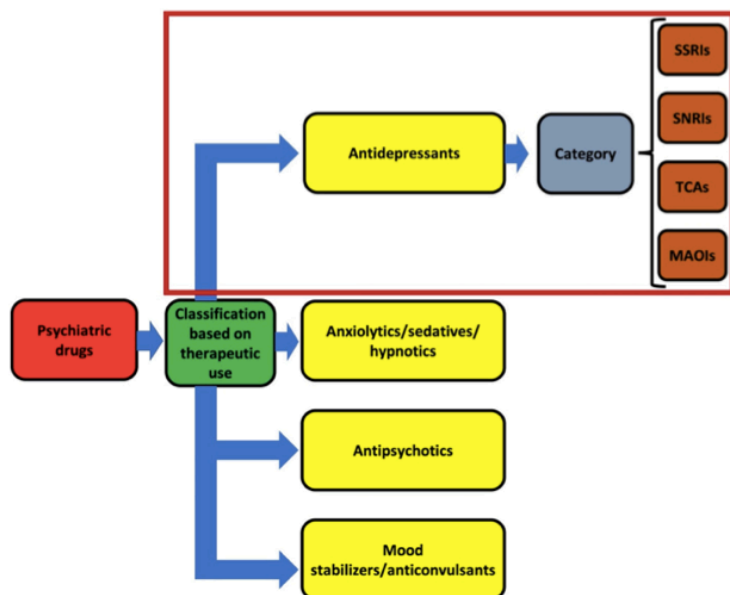


Fig. 1. Classification of psychiatric drugs with special insight on antidepressants.

Fig. 1 shows that antidepressants, which are a category of psychiatric drugs, may be further classified as serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), and monoamine oxidase inhibitors (MAOIs); according to their pharmacological mechanism of action (Fitzgerald and Watson, 2019). Among the different types of antidepressants, TCAs were the first to be introduced to patients; although they presented significant neuro-pharmacological side effects (Sheridan *et al.*, 2018). Currently, SSRIs are the most prescribed antidepressant drugs (Kulikov *et al.*, 2018). However, choosing a particular antidepressant depends on analyzing the benefits and side effects (Bayes and Parker, 2019). According to data from the Organization for Economic Co-operation and Development (OECD), European countries are the biggest consumers of antidepressants worldwide (OECD, 2020). Fig. 2 displays the most recent data presented by the OECD (the USA was not included in this OECD study). These compounds can modulate the central nervous system, resulting in the alteration of reproduction cycles, social relationships, predatory behavior, migration paths, and the circadian cycle, which is why such drugs pose a threat to living beings (Tanoue *et al.*, 2019).

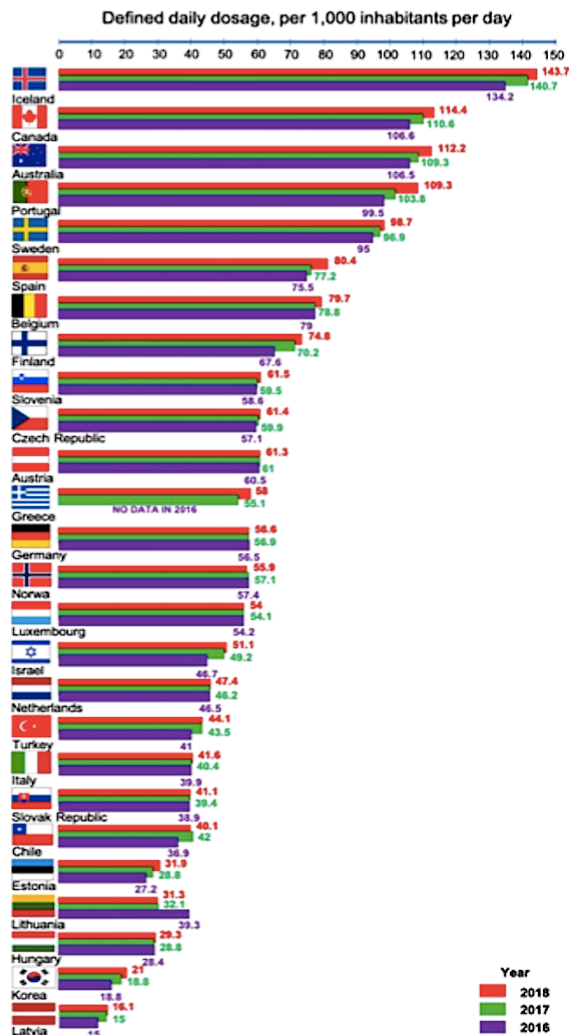


Fig. 2. Antidepressant consumption in OECD members countries.

Fig. 2. Antidepressant consumption in OECD member countries.

Antidepressant drugs are introduced to the environment due to several anthropogenic activities (Fig. 3).



Fig. 3. Origin, faith, and sources of antidepressant drugs in urban and non-urban waters.

Thus, their presence in wastewater treatment plants (WWTPs) is a clear indicator of the urbanization of the water cycle (Thiebault and Boussafir, 2019). As reported in the literature, antidepressant drugs have been observed in many water bodies, both urban and natural, around the globe (Aus der Beek *et al.*, 2016; Martin *et al.*, 2019; Mole and Brooks, 2019; Saaristo *et al.*, 2019). These studies highlight the importance of monitoring these drugs, paying close attention to areas with increasing populations and deficient wastewater treatment systems. It is important to remark that **natural water reservoirs can receive water containing these antidepressant drugs leading to their acute and chronic exposure in the aquatic native life as well as in humans** (Fig. 4) (Grabicová *et al.*, 2020; Gros *et al.*, 2012).

Table 1 [see original article link below] presents multiple recent studies exploring the **toxicological effects of the bioaccumulation of antidepressant drugs as well as their metabolites in different organisms, primarily fish, aquatic plants, mollusks, snails** (Fong *et al.*, 2019; Grabicová *et al.*, 2020; Ofoegbu *et al.*, 2019; Rojo *et al.*, 2019), and mammals (Limón-Morales *et al.*, 2019). As can be seen, there is a need for an extensive evaluation of the presence and toxicity of antidepressants members of the monoamine oxidase inhibitors (MAOIs). Indirect assessments of the occurrence of antidepressant drugs and their consumption have been carried out in the USA and European countries where the data are available (Lewer *et al.*, 2015). Moreover, such data help determine how the consumption of these medications has increased in recent years (Merikangas, 2018). The consumption pattern reflected the occurrence of these drugs in WWTPs influents, and knowledge regarding them has boosted the improvement and development of technologies for their degradation or immobilization. Some of such alternatives are listed in Table 2 [see original article link below].

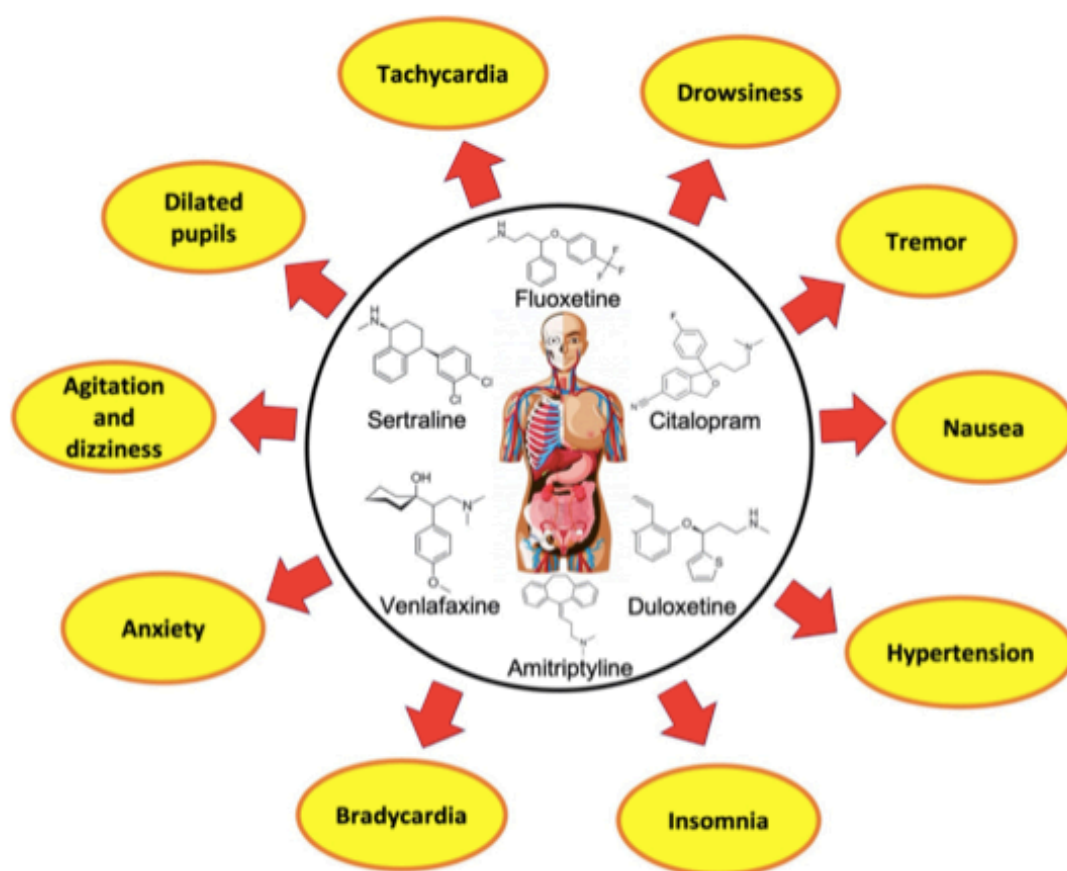


Fig. 4. Common physiological symptoms of antidepressants overdose.

Different reports confirm the presence of antidepressant drugs in water reservoirs worldwide, along with their potential bioaccumulation in aquatic organisms. For instance, in an analysis of the psychiatric drugs present in the Douro and Leçs rivers of

Portugal, the most frequent psychiatric drugs found were antidepressants such as fluoxetine, carbamazepine, citalopram, sertraline, and trazodone in concentrations of up to 2.0 ng L⁻¹ (Fernandes *et al.*, 2020). Moreover, in the UK, citalopram and fluoxetine have been detected in drinking water at concentrations of 2.26–2.80 ng L⁻¹ and 0.27 ng L⁻¹, respectively (Peng *et al.*, 2019a). There is a lack of reports related to the presence of antidepressants in urban and non-urban waters in Latin America, although a few isolated studies have shown the presence of the antidepressants in certain areas of the continent (Peña-Guzmán *et al.*, 2019). For instance, venlafaxine has been reported in concentrations of up to 55,000 ng L⁻¹ in the Guayllabamba River in Ecuador. The concentration detected at this site was high because **urban wastewater from the metropolitan district of Quito is discharged directly into the river** (Voloshenko-Rossin *et al.*, 2015). Also, in Monterrey, Mexico, venlafaxine has been detected at concentrations ranging from 96 to 120 ng L⁻¹ in influent wastewater samples from a WWTP that serves 5 municipalities of the greater metropolitan area (Ng *et al.*, 2020). This study performed in Monterrey is the first analysis of pharmaceuticals in untreated wastewater in Northeast Mexico, an area where city authorities continuously improve guidelines in the correct drug disposition in hospitals and households (Gracia-Vásquez *et al.*, 2014).

However, despite the recent concern expressed by different international organisms, we found a gap in the literature regarding the **increase of antidepressant consumption worldwide** during the last years as well as their occurrence in the urban water cycle, and their effects in *in vivo* models. Thus, this review intends to present an overview of the analytical methods used to detect antidepressants in environmental samples.

2. Antidepressants and the COVID-19 pandemic

Depressive disorders are classified by the World Health Organization (WHO) as the principal cause of disability in developed and developing countries (Chahar Mahali *et al.*, 2020). There are many causes of depression, including factors relating to a person's socioeconomic status, technological environment, physical health, among others (Jha *et al.*, 2019; Peng *et al.*, 2019b; Ransing *et al.*, 2020; Ren *et al.*, 2020; Twenge, 2020). The recent COVID-19 pandemic has affected the population's mental health, leading to an increase in the number of people with depressive episodes in China, UK, USA, and Spain (Chen *et al.*, 2020; Lei *et al.*, 2020; Ozamiz-Etxebarria *et al.*, 2020; Pappa *et al.*, 2020; Smith *et al.*, 2020). It is clear now that **antidepressants are the first-line of therapy to treat stress, anxiety, and depressive episodes resulting from the imposed lockdown** (Khan *et al.*, 2020). Thus, their prescription and consumption should increase in the years to come. Consequently, precise monitoring of these drugs spanning the complete water cycle is needed. This monitoring could be the first step in formulating improved alternatives that may achieve degradation or immobilization of **antidepressants in wastewater treatment plants**.

3. Selective serotonin reuptake inhibitors (SSRIs)

This class of antidepressants was the first therapeutic medicine designed for psychiatry. SSRIs work by modulating serotonin distribution in the central nervous system (Hiemke and Härtter, 2000). The principal uses of SSRIs involve treating depression (minor and

major), anxiety, obsessive-compulsive disorders, as well as premenstrual dysphoric episodes (Pearlstein, 2016; Yonkers and Simoni, 2018).

3.1. Fluoxetine

SSRIs have been found in several water bodies spanning different continents with an average concentration of 600 ng L⁻¹ in the influent and 100 ng L⁻¹ in the effluent of 11 wastewater plants around the metropolitan area, Pacific coast as well as Caribbean lowlands in Costa Rica. In this study, fluoxetine, an SSRI, was analyzed using an ultra-high performance liquid chromatography (UHPLC) coupled to a triple quadrupole mass spectrometer (Ramírez-Morales *et al.*, 2020). In South America, fluoxetine was detected at a concentration of 0.58 ng L⁻¹ in the seafloor of Santos Bay in Brazil (Cortez *et al.*, 2019). Furthermore, some other sampling points were unquantifiable. For the determination of fluoxetine, each sample was analyzed using high-performance liquid chromatography (HPLC) equipped with a hybrid quadrupole ion trap mass spectrometer (HPLC-MS/MS). Another study from North America was presented by Ondarza *et al.* (2019) showed that the bioaccumulation of fluoxetine in fish ranged from concentrations of 1.1 to 9.1 µg kg⁻¹ in the Paraná River, that receives the discharge of a wastewater plant in a province of Argentina called Misiones. Even though the study does not analyze the fluoxetine concentration in water directly, it does it through the concentration in biological samples. It is important to note that the concentration may have been reduced as a result of hydrological processes. Ondarza *et al.* (2019) used an isotope-dilution liquid chromatography-tandem mass spectrometer (LC-MS/MS) adapted with an autosampler jet stream thermal gradient electrospray ionization source (ESI).

Fluoxetine has additionally been found in five municipal WWTP in Canada (identified as B, L, A, W, and N). Lajeunesse *et al.* (2012) analyzed several samples and determined the fluoxetine concentrations at each plant. Plant B, equipped with a biological nutrient removal system as its secondary treatment, serving a population of 650,000 people and with an average flow of 400,000 m³ d⁻¹ had a concentration of 16 ng L⁻¹ in its influent and 8.6 ng L⁻¹ in its effluent. Plant L, equipped with an aerated biological filter as its secondary treatment, serves a population of 110,000 people, has an average flow of 60,000 m³ d⁻¹ and had a concentration of 20 ng L⁻¹ of fluoxetine in its influent and 9.8 ng L⁻¹ in its effluent. Plant A, equipped with a trickling filter as its secondary treatment, serving a population of 900,000 people, and with an average flow of 450,000 m³ d⁻¹ had a concentration of 26 ng L⁻¹ in its influent and 20 ng L⁻¹ in its effluent. Plant W is equipped with activated sludge as its secondary treatment, serving a population of 375,000 people and with an average flow of 226,000 m³ d⁻¹ presented a concentration of 18 ng L⁻¹ in its influent and 11 ng L⁻¹ in its effluent. Finally, plant N, equipped with just primary treatment and serving a population of 75,000 people and with an average flow of 28,000 m³ d⁻¹ presented a concentration of 9 ng L⁻¹ in its influent and 7.6 ng L⁻¹ in its effluent. The quantitative analysis was performed using liquid chromatography coupled to a quadrupole mass spectrometer equipped with an electrospray ionization (ESI) source.

Fluoxetine has been found in three fish populations residing in a water effluent stream in Denton County (TX, USA) at a concentration above 1.58 ng g⁻¹ (Brooks *et al.*, 2005). This analysis was not performed in the water; nevertheless, its presence in fish tissue is indicative of the presence of fluoxetine in water. The instrumentation used for the quantitative analysis was a gas chromatograph interfaced with a quadrupole mass spectrometer (GC-MS).

3.2. Sertraline

The municipal wastewater from the Waco Metropolitan Regional treatment plant's effluent (Texas, USA) was fed to a mesocosm to study the bioaccumulation of sertraline in freshwater clams. In the study, Burket *et al.* (2020) found a concentration of 3 ng L⁻¹ during an 8-day study. The quantification of sertraline was performed using liquid chromatography with tandem mass spectrometry (LC-MS/MS) coupled to an autosampler/quaternary pumping system, jet stream thermal gradient electrospray ionization source and triple quadrupole mass analyzer. Another investigation showed the presence of sertraline in the Nanjing Qinhuai River system in China. In this study, Yang *et al.* (2020) evaluated the concentration of sertraline in the river water and subsequently, they obtained the bioaccumulation profile in plankton, benthic mollusk, and fish samples. The study found that sertraline was present at a concentration of 0.8 ng L⁻¹ in water with a trophic magnification factor (TMF) of 0.48 and a bioaccumulation factor (BAF) higher than 500, which means that this antidepressant is highly bioaccumulative. In order to quantify sertraline, an ultra-performance liquid chromatography-tandem mass spectrometer (UPLC-MS/MS) equipped with a Triple Quadrupole MS mass spectrometer with an electrospray ionization (ESI) was used.

The effects of sertraline were evaluated in a 28-day experiment using the fish *Oncorhynchus mykiss* as biological model. The major effects found were a **decrease in escape reflex and an increase in stress resistance in the fish population, representing risk in the stability of the fish population** (Vaclavik *et al.*, 2020). In order to evaluate the concentration of sertraline, high-performance liquid chromatography coupled with triple quadrupole tandem mass spectrometry (LC-MS/MS) was performed. In 2019, Burket *et al.* found a concentration of 341 µg kg⁻¹ in the body tissue of the bivalve *Corbicula fluminea* caught in the wade-able effluent stream of Pecan Creek in Texas, USA. The concentration of sertraline in the samples was determined using an isotope-dilution liquid chromatography-tandem mass spectrometry (LC-MS/MS). In this case, the presence of sertraline in the biological sample was indicative of the presence of the compound in the water. Another study showed that **in Europe, sertraline exceeds the chronic risk threshold in the Llobregat basin in Catalonia, north-eastern Spain** (Kuzmanović *et al.*, 2016). In this research, several aquatic macroinvertebrates were evaluated using the Species at Risk (SPEAR) Index. The evaluation of sertraline was performed using gas chromatography-tandem mass spectrometry and liquid chromatography-tandem and hybrid mass spectrometry.

Similarly, Hedgespeth *et al.* (2014) found that the exposure to sertraline has a drastic effect on the predator-prey response with a decrease in the feeding rates of the juvenile Eurasian perch (*Perca fluviatilis*). Similarly, to fluoxetine, 3 WWTPs in Canada (identified as B, L, and A), each serving different populations, presented low and high concentrations of sertraline in their influent and effluent. For instance, the plant that serves a population of 650,000 people, identified as B, had an influent concentration of 12 ng L⁻¹, and 8.1 ng L⁻¹ in the effluent. Moreover, the WWTP analysis that served 110,000 people (identified as L), presented an influent and effluent concentration of sertraline of 26 ng L⁻¹ and 14 ng L⁻¹, respectively. Finally, the WWTP that serves a population of 900,000 people (identified as A) had an influent concentration of 23 ng L⁻¹ and 16 ng L⁻¹ in its effluent (Lajeunesse *et al.*, 2012). In this study, the quantitative analysis was performed using liquid chromatography coupled to a quadrupole mass spectrometer equipped with electrospray ionization (ESI) source.

3.3. Citalopram

Citalopram is another SSRI drug prescribed to treat depression. In Spain, **this antidepressant has been found in an extensive agricultural land in Madrid**, where surface water (impacted by WWTP effluents) is reused for irrigation (de Santiago-Martín *et al.*, 2020). In Asia, **in the Nanjing Qinhuai River system in China**, Yang *et al.* (2020) analyzed the **concentration of citalopram in water** and obtained the bioaccumulation profile of this antidepressant **in plankton, benthic mollusks, and fish samples**. In this study, citalopram was found at a concentration of 0.9 ng L⁻¹ with a trophic magnification factor (TMFs) of 0.42, which represents a medium value of TMF as well as with BAF values ranging from 1000 to 5000. In this study, citalopram was evaluated from the samples using an ultra-performance liquid chromatography-tandem mass spectrometer (UPLC-MS/MS) equipped with a Triple Quadrupole MS mass spectrometer with an electrospray ionization (ESI) source. Besides, citalopram was found at a concentration of 24 ng L⁻¹ in the Zivny Stream (Blanice River, Czech Republic). Additionally, Grabicová *et al.* (2017) classified citalopram as a potential bioaccumulative compound using the bioaccumulation factor (BAF > 500). These researchers used a triple stage quadrupole MS/MS TSQ Quantum Ultra Mass Spectrometer.

Similarly, in Canada, Citalopram has been detected in five WWTP. One of them had an average flow rate of 400,000 m³ d⁻¹ and presented concentrations of 326 ng L⁻¹ and 223 ng L⁻¹ in the influent and effluent, respectively. Another WWTP with an average flow of 60,000 m³ d⁻¹ displayed concentrations of 302 ng L⁻¹ and 219 ng L⁻¹ in its influent and effluent, respectively. Furthermore, a WWTP with an average flow of 45,000 m³ d⁻¹ was found to have a citalopram concentration of 216 ng L⁻¹ and 208 ng L⁻¹ in its influent and effluent, respectively. In this study, the analysis of another plant's influent and effluent with an average flow of 226,000 m³ d⁻¹ had a concentration of 144 ng L⁻¹ (influent) and 86 ng L⁻¹ (effluent). Finally, in the fifth WWTP analyzed with an average flow of 28,000 m³ d⁻¹, a concentration of 136 ng L⁻¹ and 131 ng L⁻¹ in its influent and effluent was found, respectively (Lajeunesse *et al.*, 2012). The quantitative analysis was performed using liquid chromatography coupled to a quadrupole mass spectrometer equipped with electrospray ionization (ESI) source.

4. Serotonin-norepinephrine reuptake inhibitors (SNRIs)

Currently, the antidepressant members of the family of the serotonin-norepinephrine reuptake inhibitors (SNRIs) are the second most preferred treatment for early diagnosis depression. SNRIs are a more potent option than SSRIs (Ahmadimanesh *et al.*, 2020). At the moment, venlafaxine, duloxetine, milnacipran, and desvenlafaxine are the only commercially available drugs of this category. They are long-term medications that are also classified as carcinogenic and genotoxic. Their environmental toxicity and bioaccumulation potential must be considered and evaluated.

4.1. Venlafaxine

In China, Ma *et al.* (2020) collected several samples from the Beiyun River in order to analyze the presence of venlafaxine and some of its transformation products. The river's flow in the metropolitan area of Beijing is mainly composed of WWTP effluents. The study determined that the venlafaxine concentration in the river was 22.9 ng L⁻¹.

Furthermore, they found that R-venlafaxine is more easily transformed than its chiral isomer S-venlafaxine by a demethylation reaction. Ultra-high performance liquid

chromatography coupled to a tandem mass spectrometry was used for the analysis. In the Leça River in Portugal, venlafaxine was found at a concentration of 641 ng L⁻¹ (Fernandes *et al.*, 2020). In South America, the accumulation of venlafaxine in fish that inhabit the Rio de la Plata Basin in Uruguay was evaluated and used to indicate the presence of this antidepressant in the river (Rojo *et al.*, 2019). In this research, venlafaxine was accumulated in concentrations ranging between 1 and 10 µg kg⁻¹ and the analysis was performed using ultra-performance liquid chromatography (UPLC) coupled to a triple quadrupole-linear ion trap mass spectrometer. In Africa, specifically in South Africa, the evaluation of the presence and quantification of emerging contaminants was performed in the Jukskei River. In this study, Rimayi *et al.* (2018) found the presence of venlafaxine at a concentration of 0.2–4 ng L⁻¹ in different points along-side this river. In the Lis River in Portugal, 20 pharmaceuticals, and their human metabolites were detected; venlafaxine was found at maximum concentration of 159 ng L⁻¹. In this study, the influent of 2 WWTP showed the presence of this medication in a range of concentrations between 39.4 and 66.7 ng L⁻¹ (Paíga *et al.*, 2016). In this research, the quantitative analysis was performed using ultra-high-performance liquid chromatography coupled to a triple-quadrupole mass spectrometer detector with electrospray ionization (ESI).

There are reports in the literature that indicate that **venlafaxine has been found in WWTPs in the United States**. For instance, it was detected at a concentration of 220 ng L⁻¹ in a WWTP effluent in Boulder Creek, Colorado. In the same study, 210 ng L⁻¹ of the same medication was detected in a WWTP effluent in Fourmile Creek in Iowa, USA (Schultz *et al.*, 2010). Furthermore, O-desmethylvenlafaxine and venlafaxine were found downstream of a WWTP in Waterloo in Canada at concentrations of 109 ng L⁻¹ and 47 ng L⁻¹, respectively (evaluated by LC-MS/MS system) (Metcalf *et al.*, 2010). **The principal threat that venlafaxine possesses is that due to its high solubility in water, it may spread in freshwater communities and circulate throughout the body of a living organism** (Ali *et al.*, 2014). Finally, in Beijing, China, venlafaxine has been detected in 3 different WWTPs. In this study, the concentrations of this antidepressant were 31.8, 63.7, and 30.3 ng L⁻¹ and were analyzed by ultra-high performance liquid chromatography adapted with a tandem mass spectrometer (Sheng *et al.*, 2014).

4.2. Duloxetine

Another significant antidepressant is duloxetine, a first-line antidepressant used to treat major depressive disorder (MDD). MDD is a disorder that affects a patient's daily routine by producing a sense of hopelessness, insomnia, and despair (De Donatis *et al.*, 2019). This antidepressant has been found in many water samples of different origins. For instance, in a WWTP of Lisbon, Portugal, influent and effluent samples were collected, and duloxetine was found at 95.5 ng L⁻¹ (influent) and 79.6 ng L⁻¹ (effluent). These results indicate that WWTPs remove only around 17% of the antidepressant (Osawa *et al.*, 2019). The samples' analysis was performed by ultra-high-performance liquid chromatography coupled to quadrupole time-of-flight (QTOF) mass spectrometer with an electrospray ion source.

5. Tricyclic antidepressants (TCAs)

TCAs are one of the most widely used neuroactive pharmaceuticals when treating depression and mood diseases and other neuropathic-associated illnesses (Silva *et al.*, 2015). TCAs have an SNRI-like mechanism of action, which consists in obstructing the

reabsorption of the neurotransmitters serotonin and norepinephrine (Sharma, 2017). Moreover, the consumption of TCAs has increased annually by approximately 10% (Choi *et al.*, 2018). Currently, there is a relevant concern regarding the separation and transformation of TCAs in wastewaters, due to complications related to the notorious potential of bioaccumulation in animal tissues that these compounds possess, despite the concentration of TCAs at the end of these processes being considerably low, since, in surface waters, they are found in trace amounts (David *et al.*, 2018; Tahmasbi *et al.*, 2016). A hazardous presence of these molecules (and their metabolites) is frequently detected in freshwaters and groundwaters due to the eventual incorporation of industrial effluents into several environments, even though they had been previously treated (Ziarrusta *et al.*, 2016).

Furthermore, the exposure to these emergent pollutants has been related to long-term effects in aquatic species, including immunological, visual, and cardiac disorders. Their effect in organisms may present consequences in several stages of their life cycles (Choi *et al.*, 2020; Huang *et al.*, 2019a). On the other hand, although reports of short-term toxicity due to TCA exposure in aquatic species are limited, the effects are expected to be similar to SSRI-type antidepressants, affecting mainly the behavioral characteristics of organisms (Fong *et al.*, 2019). Moreover, some aquatic photosynthetic species, such as green microalgae and cyanobacteria, have demonstrated the potential to adsorb these pharmaceuticals on their surface, increasing the environmental concentration of these compounds due to their accumulation, which enhances the concern for a better comprehension of the effects of TCAs on more complex organisms with a superior trophic level (Cho *et al.*, 2019).

5.1. Clomipramine

Clomipramine is considered a highly efficient TCA due to its effects when treating specific mental diseases compared to other pharmaceuticals with similar effects such as SSRIs. Furthermore, TCA drugs are highly prescribed for psychiatry and pediatric patients (Skapinakis *et al.*, 2016; Varigonda *et al.*, 2016). Thus, their presence has been studied in several kinds of waters from different regions. For instance, the studies performed by Wu *et al.* (2017) intended to analyze the occurrence of clomipramine in the Huangpu River, Shanghai, China, since it is the main destination of effluents of all the local WWTPs. Aliquots were taken in 17 different sites of the river's top torrent, and the antidepressant was detected in 4 of the collected samples at a maximal concentration of 3.2 ng L⁻¹.

Similarly, Campos-Mañas *et al.* (2017) successfully developed and validated an analytical method for screening a wide range of emerging contaminants, including clomipramine, and implemented it in the analysis of samples collected from a WWTP located in Almeria, Spain. The protocol consisted of a direct injection of the samples into a UHPLC system coupled to a quadrupole-linear ion trap tandem mass spectrometry analyzer (QqLIT-MS/MS). The antidepressant was detected at an average concentration of 28 ng L⁻¹.

The understanding of the effects that clomipramine has on aquatic species is limited. Experiments carried by Sehonova *et al.* (2017) aimed to observe the consequences of long-term exposure to clomipramine in the fish species *Cyprinus carpio*, throughout the early stages of its development. Exposure was tested at three different clomipramine concentrations: 10 µg L⁻¹, 100 µg L⁻¹, and 500 µg L⁻¹. Mortality was tested as well, with cardiac toxicity being the main cause of larval death. Samples of

models were taken for 30 days. Specimens sampled on days 5, 12, 26, and 30 that interacted with clomipramine at medium concentrations showed significant developmental retardation. This effect was observed in samples of days 12, 19, and 26, with treatments of low levels of the antidepressant. Moreover, **notorious complications in swimming abilities were observed**. Finally, the average total length and weight of all exposed samples were inferior compared to the controls. Likewise, an analysis of the bioaccumulation potential of clomipramine was carried out by Grabicová *et al.* (2017) in the study previously mentioned, using wild *Salmo trutta* (brown trout) collected from the Zivny Stream, which receives effluents from the local WWTP. **Fishes were placed into a contaminated site of the Zivny Stream. Then, samples of their kidneys and livers were taken and analyzed using quantum ultra-mass spectrometry techniques. The results exhibited a high presence of clomipramine** in concentrations of 1.2 ng g⁻¹ (kidney) and 1.8 ng g⁻¹ (liver).

5.2. Imipramine

Imipramine was the first TCA formulated and is currently commonly prescribed to treat several neuropathies besides the ones associated with depression (Shamsipur and Mirmohammadi, 2014; Xie *et al.*, 2019). Imipramine has been detected in WWTPs in Europe. For instance, Mijangos *et al.* (2018) carried out a study in which effluents of three different WWTPs in Spain were analyzed and found a low presence of this drug, detecting it in only one of the effluents, at an average concentration of 3 ng L⁻¹. A triple quadrupole HPLC-MS system with an ESI was used for the analytical procedures of this test. Furthermore, the presence of this drug has been reported in Asia, as well. In the study performed by Sheng *et al.* (2014), the results obtained by implementing an optimized analytical protocol for the determination of several environmentally significant pharmaceuticals and their metabolites revealed the presence of traces of imipramine at a maximal concentration of 10.9 ng L⁻¹. In this study, LC-MS/MS was the analytical approach used to detect this drug.

5.3. Amitriptyline

Amitriptyline is one of the most consumed antidepressants in multiple countries, and the environmental presence of this molecule is of relevant concern (Real *et al.*, 2015). Its presence has been reported in surface waters as a result of the integration of wastewater effluents. For instance, in the south Wales region of the UK, some studies exhibit the presence of amitriptyline at concentrations among 0.5 ng L⁻¹ and 21 ng L⁻¹ in samples from the river Taff (Kasprzyk-Hordern *et al.*, 2008). Likewise, it has been detected at 1.4 ng L⁻¹ in spring water dedicated to human consumption in France (Togola and Budzinski, 2008). In Canada, amitriptyline has been found in wastewater effluent samples at a concentration of 21 ng L⁻¹ and in samples taken from the effluent receiving waters (St. Lawrence River) at a concentration of 3.7 ng L⁻¹ (Lajeunesse *et al.*, 2008).

Furthermore, in non-treated wastewaters from a WWTP in Barcelona, amitriptyline was observed at concentrations of 900 ng L⁻¹ (Martínez-Bueno *et al.*, 2012). In Saudi Arabia, Alidina *et al.* (2014) analyzed the occurrence of amitriptyline in effluents of 4 local WWTPs, each with different characteristics. WWTP 1 used solids screening, biological treatment, clarification, flocculation, multimedia filtration, and chlorination. WWTP 2 used fine screens, a membrane bioreactor, and chlorination. WWTP 3 was comprised of coarse and fine screens, a biological nutrient removal stage, a secondary clarification stage, and a UV disinfection stage. WWTP 4 comprised solid screening, biological nutrient removal, secondary clarification, and disinfection with

chlorine. The authors specified that plants 1 and 3 had a high volumetric capacity while the rest did not. This study showed that higher concentrations of amitriptyline were found in samples collected from plant 3, with a mean value of 365 ng L⁻¹ while the concentrations observed in the other plants were lower. An LC-MS/MS method was implemented for the analysis of all the samples. **Authors suggested that results related to the amount of amitriptyline observed in effluents from plant 3 are potentially associated with international tourists' presence in the plant's city.** In 2006, 1,460,000 pilgrims from outside the country spent time in the area surrounding WWTP 3. Furthermore, the authors note that amitriptyline is not commonly prescribed in Saudi Arabia.

Several studies have been done in order to evaluate the toxicity of amitriptyline in marine species. Experiments carried by Demin *et al.* (2017) aimed to determine the behavioral and neurochemical effects of this molecule in adult vertebrates, using zebrafish (*Danio rerio*) for the animal models. For the first test, fish were exposed to three different concentrations of the drug for 6 h: 1000 µg L⁻¹, 5000 µg L⁻¹, and 10,000 µg L⁻¹, which are considerably high levels when compared to its environmental presence. For the neurochemical test, zebrafish models were exposed to concentrations of 5000 µg L⁻¹ and 10,000 µg L⁻¹ for 20 min. Subsequently, samples of the brain from each zebrafish were taken and pretreated for analysis by HPLC with electrochemical detection to determine singularities in the synthesis of serotonin, noradrenaline, and 5-hydroxyindoleacetic acid during exposure. Results showed behavioral affectations in populations exposed to 5000 µg L⁻¹ and 10,000 µg L⁻¹ since they presented a lower swimming velocity than the control models. Likewise, fish exposed to 1000 µg L⁻¹ and 5000 µg L⁻¹ demonstrated a preference for swimming in the tank's top regions of the tank. Furthermore, neurochemical tests showed a significant rise in the 5-hydroxyindoleacetic acid concentrations and lower amounts of serotonin in the brains of fish exposed to 10,000 µg L⁻¹ of amitriptyline, as an indicator of a potential serotonergic activity during the exposure. Similar behavioral results were observed in tests performed by Meshalkina *et al.* (2018) for the assessment of the chronic toxicity of amitriptyline, where models of *D. rerio* were exposed to concentrations of the drug of 10 µg L⁻¹ and 50 µg L⁻¹ for 2 weeks and presented a preference for swimming near the surface of the tank. In another experiment carried out by Yang *et al.* (2014) using zebrafish (*D. rerio*) embryos, trace amounts of amitriptyline directly affected relevant developmental stages of the organism. For instance, significant retardations in the hatching times of eggs exposed to sublethal doses of the antidepressant were observed.

5.4. Doxepin

Another environmentally relevant TCA is Doxepin, and its presence has been reported worldwide. For instance, in Austria, it was detected at 33 ng L⁻¹ in samples obtained from the Danube River (Lomba *et al.*, 2019). Furthermore, a study performed by Borova *et al.* (2014) that aimed to develop and optimize an analytical method for the simultaneous detection of a wide range of psychoactive drugs, all of them currently considered emergent pollutants, in 5 different WWTP influents and effluents in Santorini Island, Greece. The analytical method consisted of an LC-based separation of the analytes using a reverse-phase pentafluorophenyl column, further ionized by electrospray, coupled to a tandem mass spectrometry (MS/MS) system. This method was then statistically validated by linearizing the calibration curves obtained for each analyte and determining a *r*² value higher than 0.99 in all the cases analyzed. Doxepin was found at concentrations of up to 500 ng L⁻¹. Likewise, Gurke *et al.* (2015) analyzed **the presence**

of a relevant number of drugs in the influents and effluents of a WWTP located in Dresden, Germany, which serves 740,000 individuals. Samples were taken on three different days. **The presence of doxepin traces was detected in all samples,** at a maximal concentration of 71.6 ng L⁻¹ in influents and 78.1 ng L⁻¹ in effluents. The separation techniques implemented in this experiment started with a solid-phase extraction followed by an HPLC method using a C18 column coupled to an MS/ MS system to analyze the compounds. Moreover, this molecule is tightly associated to the synthesis of carcinogenic products such as N- nitrosodimethylamine, due to interactions with chloramines formed when ammonia is used during chlorination, one of the most common disinfection methods implemented in WWTPs to obtain drinking water (How *et al.*, 2016; Lv and Li, 2019).

Regarding the toxicological effects that doxepin has on marine life, behavioral alterations in fish induced by the exposure to this pharmaceutical have been previously reported (Burkina *et al.*, 2015). A study performed by Hu i. (2012) suggests induction of the expression of the 5-HT_{2A} receptor in the presence of high concentrations of doxepin in the goldfish environment. Injuries were provoked in *Carassius auratus* and treated with doxepin. After a 3-day exposure to doxepin at 3 mg L⁻¹, a western blot test exhibited a significant 5-HT_{2A} protein expression. Furthermore, this effect has been associated with the manifestation of anxiety-like conduct in fish (Xiang *et al.*, 2019).

5.5. Nortriptyline

Nortriptyline is an active metabolite of amitriptyline, and its prescription has experienced a dramatic increase in the last years, as it has been presented as an alternative to other antidepressants with **higher adverse effects** (Hejazi and McCallum, 2014). Its occurrence in several regions has been reported. For instance, **in the UK, the presence of nortriptyline in wastewater** has been detected in a range of 106 ng L⁻¹ to 2092 ng L⁻¹ (influent) and 66 ng L⁻¹ to 207 ng L⁻¹ (effluent) (Petrie *et al.*, 2015). Also, the study performed by Sheng *et al.* (2014), determined the presence of amitriptyline in all influent samples taken from three WWTPs in Beijing, China (WWTP1: 47.8 ng L⁻¹; WWTP2: 35.1 ng L⁻¹; WWTP3: 43.8 ng L⁻¹). This study has not specified the treatments included in every single treatment plant. Experiments made by Solagaistua *et al.* (2018) intended to evaluate the effects of the exposure of endemic specimens of *Echinogammarus berilloni* to effluents of a WWTP in Elgoibar, Spain, that operates for approximately 90,000 inhabitants. Two different designs were tested for this experiment, one under laboratory conditions and the other in-situ. A profile of the different organic contaminants present in the effluent was obtained, using high-performance liquid chromatography coupled to a triple quadrupole mass spectrometer with an integrated electrospray ionizer for the separation. **Nortriptyline was detected in effluents collected for both laboratory and in-situ trials,** at an average concentration of 10.5 ng L⁻¹ and 13 ng L⁻¹, respectively. Another method was developed by Baker *et al.* (2014) to estimate several pharmaceuticals and illicit drugs present in a WWTP located in the UK. Samples of influents were taken each day throughout one week, using a UHPLC-MS/MS system, the maximum concentration of nortriptyline detected was 8.3 ng L⁻¹.

The information available related to the effects induced by nortriptyline in aquatic organisms is still limited. Likewise, behavioral alterations were observed in samples exposed to nortriptyline, such as a lack of swimming and other abnormalities in developmental stages.

6. Monoamine oxidase inhibitors (MAOIs)

These molecules' therapeutic potential was recognized in the mid- 20th century, and their consumption is restricted due to the appearance of several side effects. MAOIs are commonly prescribed as antidepressants when patients obtain negative results from other antidepressants (Al-Nuaimi *et al.*, 2012; Saraghi *et al.*, 2017; Sharma, 2017). MAOIs are usually categorized as MAO-A inhibitors, MAO-B inhibitors, hydrazines, and non-hydrazines, depending on their structural properties (Saka, 2017). As indicated by their name, the mechanism of action of MAOIs involve a reduction of the activity of monoamine oxidase enzymes, compromising the metabolism of specific neurotransmitters. The mechanism of inhibition and the type of MAO enzyme affected varies depending on the type of MAOIs (Mathew *et al.*, 2019). For instance, the inhibition induced by several MAOIs may not be reversible, while others have presented a nonselective activity (Al-Nuaimi *et al.*, 2012). These properties have led to a significant decrease in these pharmaceuticals' consumption throughout the decades since newer antidepressants resulted in more selective, secure, and efficient (Gillman *et al.*, 2019). However, discoveries have revealed the promising potential of MAOIs to treat neurodegenerative pathologies such as Alzheimer's and Parkinson's disease, since some of these compounds have presented neuroprotective properties. There is currently an interest in developing of MAOI-based technologies for their use in the design of novel therapies (Al-Nuaimi *et al.*, 2012; Carradori and Petzer, 2015; Entzeroth and Ratty, 2017).

6.1. Phenelzine

Recent reports related to the presence of this MAOI are limited. In Greece, a study developed by Gago-Ferrero *et al.* (2020) estimated **the presence of phenelzine and several other pharmaceutical pollutants in influents and effluents of a WWTP located in Athens, that serves for about 5,200,000 individuals**. The study validates and applies a novel analytical method designed for a massive and simultaneous detection of contaminants, consisting of ultra-high performance liquid chromatography coupled to a quadrupole-time-of-flight mass spectrometer. Phenelzine was found in both influents and effluents, in a maximal concentration of 0.036 and 0.011 μL^{-1} , respectively. In experiments developed by Ali *et al.* (2012), zebrafish (*D. rerio*) embryos were exposed to phenelzine at a wide range of concentrations to find the LC50 value at different times after egg fertilization. The LC50 was determined to be 87,500 $\mu\text{g L}^{-1}$, 20,700 $\mu\text{g L}^{-1}$, 9400 $\mu\text{g L}^{-1}$, and 11,500 $\mu\text{g L}^{-1}$ after 24 h, 48 h, 72 h, and 96 h, respectively. Nevertheless, the information available regarding the effects of this MAOI on aquatic species is still limited.

6.2. Tranylcypromine

Tranylcypromine is another MAOI of the first antidepressants developed and used long before developing safer and more effective drugs. Its use is mostly limited to cases of depression that do not respond to other medications. It has been studied for use in the treatment of bipolar depression (Heijnen *et al.*, 2015). Femina Carolin *et al.* (2020) provided insights on the recent advancements in the removal of pharmaceutical compounds such as tranylcypromine using membrane biological reactors (MBRs). Regarding analytical methods, Saka (2017) developed an analytical procedure using high-performance liquid chromatography (HPLC) and a mass spectrometer (MS) with electrospray ionization (ESI) interface to detect several monoamine oxidase inhibitors, including tranylcypromine. This compound as well as some other pharmaceuticals such

as carbamazepine and gemfibrozil can be completely removed from wastewater through the biodegradation performed by activated sludge (Prasertkulsak *et al.*, 2019). **It is necessary to evaluate the risks that these drugs represent to living beings due to their carcinogenic nature and high toxicity when consumed over long periods.** However, there is not sufficient information regarding the effects of tranylcypromine in water because this was one of the first antidepressants to be used therapeutically and has been gradually replaced by others that pose larger threats as emerging contaminants.

7. Instrumental approaches

The analytical techniques most employed for detecting antidepressants in solid and liquid samples are described above in the Sections 4–6. Gas chromatography (GC) or liquid chromatography (LC) coupled to mass spectrometry (MS) are usually applied to detect antidepressant drugs. Volatile or non-polar antidepressants and their metabolites are separated using GC (Sparkman *et al.*, 2011). One of the main characteristics of GC is the inclusion of a derivatization process to increase volatility and sensitivity (Subramaniam *et al.*, 2013). However, a disadvantage to this step is that it represents an increment in the total analysis time (Bowden *et al.*, 2009). GC coupled to MS offers a compound-specific mass spectra when an electron ionization (EI) is chosen as the ionization mode (Foltz *et al.*, 2016).

On the other hand, polar compounds are separated by LC (Martín- Pozo *et al.*, 2019). Since most of the emerging contaminants and antidepressants are found at low concentrations in different environmental matrices, liquid chromatography with tandem mass spectroscopy (LC-MS/MS) is widely employed (Richardson, 2012). The principal advantage of the LC-MS/MS methodology is its high selectivity when evaluating pharmaceuticals, their derivatives and metabolites from environmental samples (Petrović *et al.*, 2005). The selectivity and sensitivity of the MS detector depends on the ionization selected. As shown in the previous sections, electrospray ionization (ESI) is the most widely used technique for detecting antidepressants such as fluoxetine and sertraline. The principal reason behind this is that ESI is the most potent ionization approach for ionizing target compounds (Huang *et al.*, 2019b). The instrumental techniques used for the quantification of the antidepressants presented in this review are summarized in Table 3 [see original article link below].

8. Concluding remarks

The presence of antidepressant drugs in the urban water cycle means that, in some instances, wastewater plants can eliminate them efficiently by degradation or immobilization. **The worst-case scenario presented is when these drugs are found in aquatic animals in rivers or oceans worldwide.** The toxicological effect of antidepressants on animals depends on animal stage development, dosage, and exposition time. However, **the most common effects include 1) changes in the weight, 2) swimming alterations, 3) suppression of the escape reflex, and 4) decrease food ingestion.** Based on the information reviewed, the knowledge of the occurrence of some TCA and MAOI members in water, wastewater, and aquatic organisms is minimal. There is an urgent need to develop better extraction techniques to detect and quantify low concentrations of antidepressants and their metabolites in aquatic biota at different trophic levels. All this information and a better understanding of the chemical changes

these drugs experience due to biological and non-biological means in the environment will help re-design and update wastewater treatment plants to be able to degrade antidepressant compounds efficiently.

References

- de Abreu, M.S., Maximino, C., Cardoso, S.C., Marques, C.I., Pimentel, A.F.N., Mece, E., Winberg, S., Barcellos, L.J.G., Soares, M.C., 2020. Dopamine and serotonin mediate the impact of stress on cleaner fish cooperative behavior. *Horm. Behav.* 125, 104813. <https://doi.org/10.1016/j.yhbeh.2020.104813>.
- Ahmadimanesh, M., Balarastaghi, S., Rashedinia, M., Yazdian-Robati, R., 2020. A systematic review on the genotoxic effect of serotonin and norepinephrine reuptake inhibitors (SNRIs) antidepressants. *Psychopharmacology* 237, 1909–1915. <https://doi.org/10.1007/s00213-020-05550-8>.
- Ali, S., Champagne, D.L., Richardson, M.K., 2012. Behavioral profiling of zebrafish embryos exposed to a panel of 60 water-soluble compounds. *Behav. Brain Res.* 228, 272–283. <https://doi.org/10.1016/j.bbr.2011.11.020>.
- Ali, L., Ahmad, M., Usman, M., Yousuf, M., 2014. Controlled release of highly water-soluble antidepressant from hybrid copolymer poly vinyl alcohol hydrogels. *Polym. Bull.* 71, 31–46. <https://doi.org/10.1007/s00289-013-1043-8>.
- Alidina, M., Hoppe-Jones, C., Yoon, M., Hamadeh, A.F., Li, D., Drewes, J.E., 2014. The occurrence of emerging trace organic chemicals in wastewater effluents in Saudi Arabia. *Sci. Total Environ.* 478, 152–162. <https://doi.org/10.1016/j.scitotenv.2014.01.093>.
- Almaqdi, K.A., Morsi, R., Alhayuti, B., Alharthi, F., Ashraf, S.S., 2019. LC-MS/MS based screening of emerging pollutant degradation by different peroxidases. *BMC Biotechnol.* 19, 1–16. <https://doi.org/10.1186/s12896-019-0574-y>.
- Al-Nuaimi, S.K., MacKenzie, E.M., Baker, G.B., 2012. Monoamine oxidase inhibitors and neuroprotection: a review. *Am. J. Ther.* 19, 436–448. <https://doi.org/10.1097/MJT.0b013e31825b9eb5>.
- Angeles, L.F., Mullen, R.A., Huang, I.J., Wilson, C., Khunjar, W., Sirotkin, H.I., McElroy, A.E., Aga, D.S., 2020. Assessing pharmaceutical removal and reduction in toxicity provided by advanced wastewater treatment systems. *Environ. Sci. Water Res. Technol.* 6, 62–77. <https://doi.org/10.1039/c9ew00559e>.
- Assareh, N., Elbatsh, M.M., Marsden, C.A., Kendall, D.A., 2012. The effects of chronic administration of tranylcypromine and rimonabant on behaviour and protein expression in brain regions of the rat. *Pharmacol. Biochem. Behav.* 100, 506–512. <https://doi.org/10.1016/j.pbb.2011.10.017>.
- Atta, F.A.M., Tousson, E., Dabour, N.A., Massoud, A.A., Hasan, F.A., 2019. Amitriptyline induced alterations in liver and kidney functions and structures in male rats. *Asian J. Res. Med. Pharm. Sci.* 7, 1–10. <https://doi.org/10.9734/ajrimps/2019/v7i430128>.
- Aus der Beek, T., Weber, F.A., Bergmann, A., Hickmann, S., Ebert, I., Hein, A., Küster, A., 2016. Pharmaceuticals in the environment—global occurrences and perspectives. *Environ. Toxicol. Chem.* 35, 823–835. <https://doi.org/10.1002/etc.3339>.

- Bachour, R.L., Golovko, O., Kellner, M., Pohl, J., 2020. Behavioral effects of citalopram, tramadol, and binary mixture in zebrafish (*Danio rerio*) larvae. *Chemosphere* 238, 124587. <https://doi.org/10.1016/j.chemosphere.2019.124587>.
- Baker, D.R., Barron, L., Kasprzyk-Hordern, B., 2014. Illicit and pharmaceutical drug consumption estimated via wastewater analysis. Part A: chemical analysis and drug use estimates. *Sci. Total Environ.* 487, 629–641. <https://doi.org/10.1016/j.scitotenv.2013.11.107>.
- Bayes, A., Parker, G., 2019. How to choose an antidepressant medication. *Acta Psychiatr. Scand.* 139, 280–291. <https://doi.org/10.1111/acps.13001>.
- Billah, M.M., Rayhan, M.A., Yousuf, S.A., Nawrin, K., Rayhan, J., Khengari, E.M., 2019. A novel integrated (OF-HC-EPM) approach to study anxiety related depressive behavior in mice model: a comparison of neuro standards. *Adv. Pharmacol. Pharm.* 7, 39–48. <https://doi.org/10.13189/app.2019.070301>.
- Borova, V.L., Maragou, N.C., Gago-Ferrero, P., Pistos, C., Thomaidis, N.S., 2014. Highly sensitive determination of 68 psychoactive pharmaceuticals, illicit drugs, and related human metabolites in wastewater by liquid chromatography-tandem mass spectrometry. *Anal. Bioanal. Chem.* 406, 4273–4285. <https://doi.org/10.1007/s00216-014-7819-3>.
- Bowden, J.A., Colosi, D.M., Stutts, W.L., Mora-Montero, D.C., Garrett, T.J., Yost, R.A., 2009. Enhanced analysis of steroids by gas chromatography/mass spectrometry using microwave-accelerated derivatization. *Anal. Chem.* 81, 6725–6734. <https://doi.org/10.1021/ac900663c>.
- Brooks, B.W., Chambliss, C.K., Stanley, J.K., Ramirez, A., Banks, K.E., Johnson, R.D., Lewis, R.J., 2005. Determination of select antidepressants in fish from an effluent-dominated stream. *Environ. Toxicol. Chem.* 24, 464–469. <https://doi.org/10.1897/04-081R.1>.
- Burič, M., Grabicová, K., Kubec, J., Kouba, A., Kuklina, I., Kozák, P., Grabic, R., Randák, T., 2018. Environmentally relevant concentrations of tramadol and citalopram alter behaviour of an aquatic invertebrate. *Aquat. Toxicol.* 200, 226–232. <https://doi.org/10.1016/j.aquatox.2018.05.008>.
- Burket, S.R., Wright, M.V., Baker, L.F., Chambliss, C.K., King, R.S., Matson, C.W., Brooks, B.W., 2020. Periphyton, bivalves and fish differentially accumulate select pharmaceuticals in effluent-dependent stream mesocosms. *Sci. Total Environ.* 745, 140882. <https://doi.org/10.1016/j.scitotenv.2020.140882>.
- Burkina, V., Zlabek, V., Zamaratskaia, G., 2015. Effects of pharmaceuticals present in aquatic environment on Phase I metabolism in fish. *Environ. Toxicol. Pharmacol.* 40, 430–444. <https://doi.org/10.1016/j.etap.2015.07.016>.
- Byeon, E., Park, J.C., Hagiwara, A., Han, J., Lee, J.S., 2020. Two antidepressants fluoxetine and sertraline cause growth retardation and oxidative stress in the marine rotifer *Brachionus koreanus*. *Aquat. Toxicol.* 218, 105337. <https://doi.org/10.1016/j.aquatox.2019.105337>.
- Campos-Mañas, M.C., Plaza-Bolaños, P., Sánchez-Pérez, J.A., Malato, S., Agüera, A., 2017. Fast determination of pesticides and other contaminants of emerging concern in treated wastewater using direct injection coupled to highly sensitive ultra-high performance liquid chromatography-tandem mass spectrometry. *J. Chromatogr. A* 1507, 84–94. <https://doi.org/10.1016/j.chroma.2017.05.053>.
- Cao, J., Fu, B., Zhang, T., Wu, Y., Zhou, Z., Zhao, J., Yang, E., Qian, T., Luo, J., 2020. Fate of typical endocrine active compounds in full-scale wastewater treatment plants: distribu-

- tion, removal efficiency and potential risks. *Bioresour. Technol.* 310, 123436. <https://doi.org/10.1016/j.biortech.2020.123436>.
- Carradori, S., Petzer, J.P., 2015. Novel monoamine oxidase inhibitors: a patent review (2012–2014). *Exp. Opin. Ther. Pat.* 25, 91–110. <https://doi.org/10.1517/13543776.2014.982535>.
- Chahar Mahali, S., Beshai, S., Feeney, J.R., Mishra, S., 2020. Associations of negative cognitions, emotional regulation, and depression symptoms across four continents: international support for the cognitive model of depression. *BMC Psychiatry* 20, 1–12. <https://doi.org/10.1186/s12888-019-2423-x>.
- Chen, Y., Zhou, H., Zhou, Y., Zhou, F., 2020. Prevalence of self-reported depression and anxiety among pediatric medical staff members during the COVID-19 out- break in Guiyang, China. *Psychiatry Res.* 288, 113005. <https://doi.org/10.1016/j.psychres.2020.113005>.
- Cho, C.W., Zhao, Y., Yun, Y.S., 2019. QSAR modelling for predicting adsorption of neutral, cationic, and anionic pharmaceuticals and other neutral compounds to microalgae *Chlorella vulgaris* in aquatic environment. *Water Res.* 151, 288–295. <https://doi.org/10.1016/j.watres.2018.12.033>.
- Choi, J.W., Zhao, Y., Bediako, J.K., Cho, C.W., Yun, Y.S., 2018. Estimating environmental fate of tricyclic antidepressants in wastewater treatment plant. *Sci. Total Environ.* 634, 52–58. <https://doi.org/10.1016/j.scitotenv.2018.03.278>.
- Choi, J.W., Bediako, J.K., Zhao, Y., Lin, S., Sarkar, A.K., Han, M., Song, M.H., Cho, C.W., Yun, Y.S., 2020. Adsorptive removal of cationic tricyclic antidepressants using cation-exchange resin. *Environ. Sci. Pollut. Res.* 27, 24760–24771. <https://doi.org/10.1007/s11356-019-06549-1>.
- Cortez, F.S., Souza, L. da S., Guimarães, L.L., Pusceddu, F.H., Maranhão, L.A., Fontes, M.K., Moreno, B.B., Nobre, C.R., Abessa, D.M. de S., Cesar, A., Pereira, C.D.S., 2019. Marine contamination and cytogenotoxic effects of fluoxetine in the tropical brown mussel *Perna perna*. *Mar. Pollut. Bull.* 141, 366–372. <https://doi.org/10.1016/j.marpolbul.2019.02.065>.
- Cutler, J., Williamson, S.M., Rae, R., 2019. The effect of sertraline, haloperidol and apomorphine on the behavioural manipulation of slugs (*Deroceras invadens*) by the nematode *Phasmarhabditis hermaphrodita*. *Behav. Process.* 165, 1–3. <https://doi.org/10.1016/j.beproc.2019.06.009>.
- David, A., Lange, A., Tyler, C.R., Hill, E.M., 2018. Concentrating mixtures of neuroactive pharmaceuticals and altered neurotransmitter levels in the brain of fish exposed to a wastewater effluent. *Sci. Total Environ.* 621, 782–790. <https://doi.org/10.1016/j.scitotenv.2017.11.265>.
- De Donatis, D., Florio, V., Porcelli, S., Saria, A., Mercolini, L., Serretti, A., Conca, A., 2019. Duloxetine plasma level and antidepressant response. *Prog. Neuro- Psychopharmacol. Biol. Psychiatry* 92, 127–132. <https://doi.org/10.1016/j.pnpbp.2019.01.001>.
- Demin, K.A., Kolesnikova, T.O., Khatsko, S.L., Meshalkina, D.A., Efimova, E.V., Morzherin, Y.Y., Kalueff, A.V., 2017. Acute effects of amitriptyline on adult zebrafish: potential relevance to antidepressant drug screening and modeling human toxidromes. *Neurotoxicol. Teratol.* 62, 27–33. <https://doi.org/10.1016/j.ntt.2017.04.002>.
- Demin, K.A., Lakstygail, A.M., Chernysh, M.V., Krotova, N.A., Taranov, A.S., Ilyin, N.P., Seredinskaya, M.V., Tagawa, N., Savva, A.K., Mor, M.S., Vasyutina, M.L., Efimova, E.V., Kolesnikova, T.O., Gainetdinov, R.R., Strekalova, T., Amstislavskaya, T.G., de Abreu,

- M.S., Kalueff, A.V., 2020. The zebrafish tail immobilization (ZTI) test as a new tool to assess stress-related behavior and a potential screen for drugs affecting despair-like states. *J. Neurosci. Methods* 337, 108637. <https://doi.org/10.1016/j.jneumeth.2020.108637>.
- Dorelle, L.S., Da Cuña, R.H., Sganga, D.E., Rey Vázquez, G., López Greco, L., Lo Nostro, F.L., 2020. Fluoxetine exposure disrupts food intake and energy storage in the cichlid fish *Cichlasoma dimerus* (Teleostei, Cichliformes). *Chemosphere* 238. <https://doi.org/10.1016/j.chemosphere.2019.124609>.
- Duarte, I.A., Reis-Santos, P., Novais, S.C., Rato, L.D., Lemos, M.F.L., Freitas, A., Pouca, A.S.V., Barbosa, J., Cabral, H.N., Fonseca, V.F., 2020. Depressed, hypertense and sore: long-term effects of fluoxetine, propranolol and diclofenac exposure in a top predator fish. *Sci. Total Environ.* 712. <https://doi.org/10.1016/j.scitotenv.2020.136564>.
- El-Fiky, S.A., Abou-Zaid, F.A., Farag, I.M., Fahmy, M.A., El-Fiky, N.M., 2016. Genotoxic effect of the tricyclic antidepressant drug clomipramine hydrochloride in somatic and germ cells of male mice. *Asian Pac. J. Trop. Dis.* 6, 321–327. [https://doi.org/10.1016/S2222-1808\(15\)61038-6](https://doi.org/10.1016/S2222-1808(15)61038-6).
- Entzeroth, M., Ratty, A.K., 2017. Monoamine oxidase inhibitors—revisiting a therapeutic principle. *Open J. Depress.* 06, 31–68. <https://doi.org/10.4236/ojd.2017.62004>.
- Femina Carolin, C., Senthil Kumar, P., Janet Joshiba, G., Vinoth Kumar, V., 2020. Analysis and removal of pharmaceutical residues from wastewater using membrane bioreactors: a review. *Environ. Chem. Lett.* <https://doi.org/10.1007/s10311-020-01068-9>.
- Fernandes, M.J., Paíga, P., Silva, A., Llaguno, C.P., Carvalho, M., Vázquez, F.M., Delerue-Matos, C., 2020. Antibiotics and antidepressants occurrence in surface waters and sediments collected in the north of Portugal. *Chemosphere* 239. <https://doi.org/10.1016/j.chemosphere.2019.124729>.
- Finčur, N.L., Šćepanović, M.J., Grujić-Brojčin, M., Abramović, B.F., Krstić, J.B., Kremenović, A., Srećković, T., Golubović, A., 2019. Adsorption and degradation of some psychiatric drugs by sol-gel synthesized titania-based photocatalysts: influence of tungsten and sodium content. *J. Sol-Gel Sci. Technol.* 90, 510–524. <https://doi.org/10.1007/s10971-019-04925-4>.
- Fitzgerald, P.J., Watson, B.O., 2019. In vivo electrophysiological recordings of the effects of antidepressant drugs. *Exp. Brain Res.* 237, 1593–1614. <https://doi.org/10.1007/s00221-019-05556-5>.
- Foltz, R.L., Andrenyak, D.M., Crouch, D.J., 2016. Forensic science, applications of mass spectrometry. *Encyclopedia of Spectroscopy and Spectrometry*. Elsevier Ltd., pp. 707–711 <https://doi.org/10.1016/B978-0-12-803224-4.00152-7>.
- Fong, P.P., DiPenta, K.E., Jonik, S.M., Ward, C.D., 2019. Short-term exposure to tricyclic antidepressants delays righting time in marine and freshwater snails with evidence for low-dose stimulation of righting speed by imipramine. *Environ. Sci. Pollut. Res.* 26, 7840–7846. <https://doi.org/10.1007/s11356-019-04269-0>.
- Gago-Ferrero, P., Bletsou, A.A., Damalas, D.E., Aalizadeh, R., Alygizakis, N.A., Singer, H.P., Hollender, J., Thomaidis, N.S., 2020. Wide-scope target screening of >2000 emerging contaminants in wastewater samples with UPLC-Q-ToF-HRMS/MS and smart evaluation of its performance through the validation of 195 selected representative analytes. *J. Hazard. Mater.* 387, 121712. <https://doi.org/10.1016/j.jhazmat.2019.121712>.

- García-Galán, M.J., Arashiro, L., Santos, L.H.M.L.M., Insa, S., Rodríguez-Mozaz, S., Barceló, D., Ferrer, I., Garfí, M., 2020. Fate of priority pharmaceuticals and their main metabolites and transformation products in microalgae-based wastewater treatment systems. *J. Hazard. Mater.* 390, 121771. <https://doi.org/10.1016/j.jhazmat.2019.121771>.
- Gillman, P.K., Feinberg, S.S., Fochtmann, L.J., 2019. Revitalizing monoamine oxidase inhibitors: a call for action. *CNS Spectr.*, 5–8 <https://doi.org/10.1017/S1092852919001196>.
- Gómez-Canela, C., Rovira García, X., Martínez-Jerónimo, F., Marcé, R.M., Barata, C., 2019. Analysis of neurotransmitters in *Daphnia magna* affected by neuroactive pharmaceuticals using liquid chromatography-high resolution mass spectrometry. *Environ. Pollut.* 254. <https://doi.org/10.1016/j.envpol.2019.113029>.
- Gornik, T., Kovacic, A., Heath, E., Hollender, J., Kosjek, T., 2020. Biotransformation study of antidepressant sertraline and its removal during biological wastewater treatment. *Water Res.* 181, 115864. <https://doi.org/10.1016/j.watres.2020.115864>.
- Grabicová, K., Grabic, R., Fedorova, G., Fick, J., Cervený, D., Kolarova, J., Turek, J., Zlabek, V., Randák, T., 2017. Bioaccumulation of psychoactive pharmaceuticals in fish in an effluent dominated stream. *Water Res.* 124, 654–662. <https://doi.org/10.1016/j.watres.2017.08.018>.
- Grabicová, K., Grabic, R., Fedorova, G., Kolářová, J., Turek, J., Brooks, B.W., Randák, T., 2020. Psychoactive pharmaceuticals in aquatic systems: a comparative assessment of environmental monitoring approaches for water and fish. *Environ. Pollut.* 261. <https://doi.org/10.1016/j.envpol.2020.114150>.
- Gracia-Vásquez, S.L., Ramírez-Lara, E., Camacho-Mora, I.A., Cantú-Cárdenas, L.G., Gracia-Vásquez, Y.A., Esquivel-Ferriño, P.C., Ramírez-Cabrera, M.A., Gonzalez-Barranco, P., 2014. An analysis of unused and expired medications in Mexican households. *Int. J. Clin. Pharm.* 37, 121–126. <https://doi.org/10.1007/s11096-014-0048-1>.
- Gros, M., Rodríguez-Mozaz, S., Barceló, D., 2012. Fast and comprehensive multi-residue analysis of a broad range of human and veterinary pharmaceuticals and some of their metabolites in surface and treated waters by ultra-high-performance liquid chromatography coupled to quadrupole-linear ion trap tandem. *J. Chromatogr. A* 1248, 104–121. <https://doi.org/10.1016/j.chroma.2012.05.084>.
- Gurke, R., Rossmann, J., Schubert, S., Sandmann, T., Rößler, M., Oertel, R., Fauler, J., 2015. Development of a SPE-HPLC-MS/MS method for the determination of most prescribed pharmaceuticals and related metabolites in urban sewage samples. *J. Chromatogr. B Anal. Technol. Biomed. Life Sci.* 990, 23–30. <https://doi.org/10.1016/j.jchromb.2015.03.008>.
- Hedgespeth, M.L., Nilsson, P.A., Berglund, O., 2014. Ecological implications of altered fish foraging after exposure to an antidepressant pharmaceutical. *Aquat. Toxicol.* 151, 84–87. <https://doi.org/10.1016/j.aquatox.2013.12.011>.
- Heijnen, W.T., De Fruyt, J., Wierdsma, A.I., Sienaert, P., Birkenhäger, T.K., 2015. Efficacy of tranylcypromine in bipolar depression: a systematic review. *J. Clin. Psychopharmacol.* 35, 700–705. <https://doi.org/10.1097/JCP.0000000000000409>.
- Hejazi, R.A., McCallum, R.W., 2014. Cyclic vomiting syndrome: treatment options. *Exp. Brain Res.* 232, 2549–2552. <https://doi.org/10.1007/s00221-014-3989-7>.
- Hiemke, C., Härtter, S., 2000. Pharmacokinetics of the selective serotonin reuptake inhibitors. *Pharmacol. Ther.* 85, 11–28.

- Hodkovicova, N., Sehonova, P., Blahova, J., Faldyna, M., Marsalek, P., Mikula, P., Chloupek, P., Dobsikova, R., Vecerek, V., Vicensova, M., Vosmerova, P., Svobodova, Z., 2020. The effect of the antidepressant venlafaxine on gene expression of biotransformation enzymes in zebrafish (*Danio rerio*) embryos. *Environ. Sci. Pollut. Res.* 27, 1686–1696. <https://doi.org/10.1007/s11356-019-06726-2>.
- Hollman, J., Dominic, J.A., Achari, G., 2020a. Degradation of pharmaceutical mixtures in aqueous solutions using UV/peracetic acid process: kinetics, degradation pathways and comparison with UV/H₂O₂. *Chemosphere* 248, 125911. <https://doi.org/10.1016/j.chemosphere.2020.125911>.
- Hollman, J., Dominic, J.A., Achari, G., Langford, C.H., Tay, J.H., 2020b. Effect of UV dose on degradation of venlafaxine using UV/H₂O₂: perspective of augmenting UV units in wastewater treatment. *Environ. Technol. (United Kingdom)* 41, 1107–1116. <https://doi.org/10.1080/09593330.2018.1521475>.
- Hossain, M.S., Buřič, M., Moore, P.A., 2020. Exposure paradigm of fluoxetine impacted the *Faxonius virilis* agonistic behavior differently. *Sci. Total Environ.* 699. <https://doi.org/10.1016/j.scitotenv.2019.134300>.
- How, Z.T., Linge, K.L., Buseti, F., Joll, C.A., 2016. Organic chloramines in drinking water: an assessment of formation, stability, reactivity and risk. *Water Res.* 93, 65–73. <https://doi.org/10.1016/j.watres.2016.02.006>.
- Hranilovic, D., Blazevic, S., Ivica, N., Cicin-Sain, L., Oreskovic, D., 2011. The effects of the perinatal treatment with 5-hydroxytryptophan or tranylcypromine on the peripheral and central serotonin homeostasis in adult rats. *Neurochem. Int.* 59, 202–207. <https://doi.org/10.1016/j.neuint.2011.05.003>.
- Hu, X., Li, Y., Hu, Z., Rudd, J.A., Ling, S., Jiang, F., Davies, H., Fang, M., 2012. The alteration of 5-HT_{2A} and 5-HT_{2C} receptors is involved in neuronal apoptosis of goldfish cerebellum following traumatic experience. *Neurochem. Int.* 61, 207–218. <https://doi.org/10.1016/j.neuint.2012.04.022>.
- Huang, I.J., Sirotkin, H.I., McElroy, A.E., 2019a. Varying the exposure period and duration of neuroactive pharmaceuticals and their metabolites modulates effects on the visual motor response in zebrafish (*Danio rerio*) larvae. *Neurotoxicol. Teratol.* 72, 39–48. <https://doi.org/10.1016/j.ntt.2019.01.006>.
- Huang, Z., Yao, Y.N., Li, W., Hu, B., 2019b. Analytical properties of electrospray ionization mass spectrometry with solid substrates and nonpolar solvents. *Anal. Chim. Acta* 1050, 105–112. <https://doi.org/10.1016/j.aca.2018.10.064>.
- Hubená, P., Horký, P., Grabic, R., Grabicová, K., Slavík, O., Randák, T., 2020. Environmentally Relevant Levels of Four Psychoactive Compounds Vary in Their Effects on Fresh-water Fish Condition: A Brain Concentration Evidence Approach. , pp. 1–23 <https://doi.org/10.7717/peerj.9356>.
- Ikert, H., Craig, P.M., 2020. Chronic exposure to venlafaxine and increased water temperature reversibly alters microRNA in zebrafish gonads (*Danio rerio*). *Comp. Biochem. Physiol. Pt. D Genom. Proteom.* 33, 100634. <https://doi.org/10.1016/j.cbd.2019.100634>.
- Jha, M.K., Qamar, A., Vaduganathan, M., Charney, D.S., Murrough, J.W., 2019. Screening and management of depression in patients with cardiovascular disease: JACC state-of-the-art review. *J. Am. Coll. Cardiol.* 73, 1827–1845. <https://doi.org/10.1016/j.jacc.2019.01.041>.

- Kasprzyk-Hordern, B., Dinsdale, R.M., Guwy, A.J., 2008. The occurrence of pharmaceuticals , personal care products, endocrine disruptors and illicit drugs in surface water in South Wales, UK. 42, 3498–3518. <https://doi.org/10.1016/j.watres.2008.04.026>.
- Kellner, M., Porseryd, T., Porsch-Hällström, I., Borg, B., Roufidou, C., Olsén, K.H., 2018. Developmental exposure to the SSRI citalopram causes long-lasting behavioural effects in the three-spined stickleback (*Gasterosteus aculeatus*). *Ecotoxicology* 27, 12–22. <https://doi.org/10.1007/s10646-017-1866-4>.
- Khan, S., Siddique, R., Li, H., Ali, A., Shereen, M.A., Bashir, N., Xue, M., 2020. Impact of coronavirus outbreak on psychological health. *J. Glob. Health* 10. <https://doi.org/10.7189/JOGH.10.010331>.
- Kharel, S., Stapf, M., Miehe, U., Ekblad, M., Cimbritz, M., Falås, P., Nilsson, J., Sehlén, R., Bester, K., 2020. Ozone dose dependent formation and removal of ozonation products of pharmaceuticals in pilot and full-scale municipal wastewater treatment plants. *Environ. Pollut.* 731. <https://doi.org/10.1016/j.scitotenv.2020.139064>.
- Kulikov, A.V., Gainetdinov, R.R., Ponimaskin, E., Kalueff, A.V., Naumenko, V.S., Popova, N.K., 2018. Interplay between the key proteins of serotonin system in SSRI antidepressants efficacy. *Expert Opin. Ther. Targets* 22, 319–330. <https://doi.org/10.1080/14728222.2018.1452912>.
- Kuzmanović, M., López-Doval, J.C., De Castro-Català, N., Guasch, H., Petrović, M., Muñoz, I., Ginebreda, A., Barceló, D., 2016. Ecotoxicological risk assessment of chemical pollution in four Iberian river basins and its relationship with the aquatic macroinvertebrate community status. *Sci. Total Environ.* 540, 324–333. <https://doi.org/10.1016/j.scitotenv.2015.06.112>.
- Lajeunesse, A., Gagnon, C., Sauvé, S., 2008. Determination of basic antidepressants and their N-desmethyl metabolites in raw sewage and wastewater using solid-phase extraction and liquid chromatography-tandem mass spectrometry. *ACS Publ.* 80, 5325–5333.
- Lajeunesse, A., Smyth, S.A., Barclay, K., Sauvé, S., Gagnon, C., 2012. Distribution of antidepressant residues in wastewater and biosolids following different treatment processes by municipal wastewater treatment plants in Canada. *Water Res.* 46, 5600–5612. <https://doi.org/10.1016/j.watres.2012.07.042>.
- Larsen, M.H., Hay-Schmidt, A., Rønn, L.C.B., Mikkelsen, J.D., 2008. Temporal expression of brain-derived neurotrophic factor (BDNF) mRNA in the rat hippocampus after treatment with selective and mixed monoaminergic antidepressants. *Eur. J. Pharmacol.* 578, 114–122. <https://doi.org/10.1016/j.ejphar.2007.08.050>.
- Lee, A.H., Fraz, S., Purohit, U., Campos, A.R., Wilson, J.Y., 2020. Chronic exposure of brown (*Hydra oligactis*) and green hydra (*Hydra viridissima*) to environmentally relevant concentrations of pharmaceuticals. *Sci. Total Environ.* 732, 139232. <https://doi.org/10.1016/j.scitotenv.2020.139232>.
- Lei, L., Huang, X., Zhang, S., Yang, J., Yang, L., Xu, M., 2020. Comparison of prevalence and associated factors of anxiety and depression among people affected by versus people unaffected by quarantine during the COVID-19 epidemic in southwestern China. *Med. Sci. Monit.* 26, 1–12. <https://doi.org/10.12659/MSM.924609>.

- Lewer, D., O'Reilly, C., Mojtabai, R., Evans-Lacko, S., 2015. Antidepressant use in 27 European countries: associations with sociodemographic, cultural and economic factors. *Br. J. Psychiatry* 207, 221–226. <https://doi.org/10.1192/bjp.bp.114.156786>.
- Limón-Morales, O., Arteaga-Silva, M., Rojas-Castañeda, J.C., Molina-Jiménez, T., Guadarrama-Cruz, G.V., Cerbón, M., Bonilla-Jaime, H., 2019. Neonatal treatment with clomipramine modifies the expression of estrogen receptors in brain areas of male adult rats. *Brain Res.* 1724, 146443. <https://doi.org/10.1016/j.brainres.2019.146443>.
- Llorca, M., Castellet-Rovira, F., Farré, M.J., Jaén-Gil, A., Martínez-Alonso, M., Rodríguez-Mozaz, S., Sarrà, M., Barceló, D., 2019. Fungal biodegradation of the N-nitrosodimethylamine precursors venlafaxine and O-desmethylvenlafaxine in water. *Environ. Pollut.* 246, 346–356. <https://doi.org/10.1016/j.envpol.2018.12.008>.
- Lomba, L., Ribate, M.P., Zuriaga, E., García, C.B., Giner, B., 2019. Acute and subacute effects of drugs in embryos of *Danio rerio*. QSAR grouping and modelling. *Ecotoxicol. Environ. Saf.* 172, 232–239. <https://doi.org/10.1016/j.ecoenv.2019.01.081>.
- Lv, J., Li, N., 2019. Characterization of seven psychoactive pharmaceuticals as N-nitrosodimethylamine precursors during free chlorine and chlorine dioxide chlorination processes. *J. Chem. Technol. Biotechnol.* 94, 53–62. <https://doi.org/10.1002/jctb.5755>.
- Ma, R., Qu, H., Wang, B., Wang, F., Yu, G., 2020. Widespread monitoring of chiral pharmaceuticals in urban rivers reveals stereospecific occurrence and transformation. *Environ. Int.* 138, 105657. <https://doi.org/10.1016/j.envint.2020.105657>.
- Mackulák, T., Medvecká, E., Vojs Staňová, A., Brandeburová, P., Grabic, R., Golovko, O., Marton, M., Bodík, I., Medvedová, A., Gál, M., Planý, M., Kromka, A., Špalková, V., Škulcová, A., Horáková, I., Vojs, M., 2020. Boron doped diamond electrode — the elimination of psychoactive drugs and resistant bacteria from wastewater. *Vacuum* 171. <https://doi.org/10.1016/j.vacuum.2019.108957>.
- Martin, J.M., Bertram, M.G., Saaristo, M., Ecker, T.E., Hannington, S.L., Tanner, J.L., Michelangeli, M., O'Bryan, M.K., Wong, B.B.M., 2019. Impact of the widespread pharmaceutical pollutant fluoxetine on behaviour and sperm traits in a freshwater fish. *Sci. Total Environ.* 650, 1771–1778. <https://doi.org/10.1016/j.scitotenv.2018.09.294>.
- Martínez-Bueno, M.J., Gomez, M.J., Herrera, S., Hernando, M.D., Agüera, A., Fernández-Alba, A.R., 2012. Occurrence and persistence of organic emerging contaminants and priority pollutants in five sewage treatment plants of Spain: two years pilot survey monitoring. *Environ. Pollut.* 164, 267–273. <https://doi.org/10.1016/j.envpol.2012.01.038>.
- Martín-Pozo, L., de Alarcón-Gómez, B., Rodríguez-Gómez, R., García-Córcoles, M.T., Čipa, M., Zafra-Gómez, A., 2019. Analytical methods for the determination of emerging contaminants in sewage sludge samples. A review. *Talanta* 192, 508–533. <https://doi.org/10.1016/j.talanta.2018.09.056>.
- Mathew, B., Baek, S.C., Thomas Parambi, D.G., Lee, J.P., Mathew, G.E., Jayanthi, S., Vinod, D., Rapheal, C., Devikrishna, V., Kondarath, S.S., Uddin, M.S., Kim, H., 2019. Potent and highly selective dual-targeting monoamine oxidase-B inhibitors: fluorinated chalcones of morpholine versus imidazole. *Arch. Pharm. (Weinheim)* 352, 1–11. <https://doi.org/10.1002/ardp.201800309>.
- Maulvault, A.L., Camacho, C., Barbosa, V., Alves, R., Anacleto, P., Pousão-Ferreira, P., Rosa, R., Marques, A., Diniz, M.S., 2019. Living in a multi-stressors environment: an integrated

- biomarker approach to assess the ecotoxicological response of meagre (*Argyrosomus regius*) to venlafaxine, warming and acidification. *Environ. Res.* 169, 7–25. <https://doi.org/10.1016/j.envres.2018.10.021>.
- Mehdi, H., Bragg, L.M., Servos, M.R., Craig, P.M., 2019. Multiple stressors in the environment: the effects of exposure to an antidepressant (venlafaxine) and increased temperature on zebrafish metabolism. *Front. Physiol.* 10, 1–10. <https://doi.org/10.3389/fphys.2019.01431>.
- Merikangas, K.R., 2018. Time trends in the global prevalence of mental disorders in children and adolescents: gap in data on U.S. youth. *J. Am. Acad. Child Adolesc. Psychiatry* 57, 306–307. <https://doi.org/10.1016/j.jaac.2018.03.002>.
- Meshalkina, D.A., Kysil, E.V., Antonova, K.A., Demin, K.A., Kolesnikova, T.O., Khatsko, S.L., Gainetdinov, R.R., Alekseeva, P.A., Kalueff, A.V., 2018. The effects of chronic amitriptyline on zebrafish behavior and monoamine neurochemistry. *Neurochem. Res.* 43, 1191–1199. <https://doi.org/10.1007/s11064-018-2536-5>.
- Metcalfe, C.D., Chu, S., Judt, C., Li, H., Oakes, K.D., Servos, M.R., Andrews, D.M., 2010. Antidepressants and their metabolites in municipal wastewater, and downstream exposure in an urban watershed. *Environ. Toxicol. Chem.* 29, 79–89. <https://doi.org/10.1002/etc.27>.
- Mijangos, L., Ziarrusta, H., Ros, O., Kortazar, L., Fernández, L.A., Olivares, M., Zuloaga, O., Prieto, A., Etxebarria, N., 2018. Occurrence of emerging pollutants in estuaries of the Basque Country: analysis of sources and distribution, and assessment of the environmental risk. *Water Res.* 147, 152–163. <https://doi.org/10.1016/j.watres.2018.09.033>.
- Mole, R.A., Brooks, B.W., 2019. Global scanning of selective serotonin reuptake inhibitors: occurrence, wastewater treatment and hazards in aquatic systems. *Environ. Pollut.* 250, 1019–1031. <https://doi.org/10.1016/j.envpol.2019.04.118>.
- Molina-Jiménez, T., Jiménez-Tlapa, M., Brianza-Padilla, M., Zepeda, R.C., Hernández-González, M., Bonilla-Jaime, H., 2019. The neonatal treatment with clomipramine decreases sexual motivation and increases estrogen receptors expression in the septum of male rats: effects of the apomorphine. *Pharmacol. Biochem. Behav.* 180, 83–91. <https://doi.org/10.1016/j.pbb.2019.03.004>.
- Nałęcz-Jawecki, G., Wawryniuk, M., Giebułtowicz, J., Olkowski, A., Drobniewska, A., 2020. Influence of selected antidepressants on the ciliated protozoan *Spirostomum ambiguum*: toxicity, bioaccumulation, and biotransformation products. *Molecules* 25.
- Ng, K.T., Rapp-Wright, H., Egli, M., Hartmann, A., Steele, J.C., Sosa-Hernández, J.E., Melchor-Martínez, E.M., Jacobs, M., White, B., Regan, F., Parra-Saldivar, R., Couchman, L., Halden, R.U., Barron, L.P., 2020. High-throughput multi-residue quantification of contaminants of emerging concern in wastewaters enabled using direct injection liquid chromatography-tandem mass spectrometry. *J. Hazard. Mater.* 398. <https://doi.org/10.1016/j.jhazmat.2020.122933>.
- Nowakowska, K., Giebułtowicz, J., Kamaszewski, M., Adamski, A., Szudrowicz, H., Ostaszewska, T., Solarz-Dzięciołowska, U., Nałęcz-Jawecki, G., Wroczyński, P., Drobniewska, A., 2020. Acute exposure of zebrafish (*Danio rerio*) larvae to environmental concentrations of selected antidepressants: bioaccumulation, physiological and histological changes. *Comp. Biochem. Physiol. Pt. C Toxicol. Pharmacol.* 229. <https://doi.org/10.1016/j.cbpc.2019.108670>.

- OECD, 2020. OECD health data: pharmaceutical market. OECD Health Statistics (Data- base) <https://doi.org/10.1787/data-00545-en>.
- Ofoegbu, P.U., Lourenço, J., Mendo, S., Soares, A.M.V.M., Pestana, J.L.T., 2019. Effects of low concentrations of psychiatric drugs (carbamazepine and fluoxetine) on the freshwater planarian, *Schmidtea mediterranea*. *Chemosphere* 217, 542–549. <https://doi.org/10.1016/j.chemosphere.2018.10.198>.
- Ondarza, P.M., Haddad, S.P., Avigliano, E., Miglioranza, K.S.B., Brooks, B.W., 2019. Pharmaceuticals, illicit drugs and their metabolites in fish from Argentina: implications for protected areas influenced by urbanization. *Environ. Pollut.* 649, 1029–1037. <https://doi.org/10.1016/j.scitotenv.2018.08.383>.
- Osawa, R.A., Carvalho, A.P., Monteiro, O.C., Oliveira, M.C., Florêncio, M.H., 2019. Degradation of duloxetine: identification of transformation products by UHPLC-ESI(+)-HRMS/MS, in silico toxicity and wastewater analysis. *J. Environ. Sci. (China)* 82, 113–123. <https://doi.org/10.1016/j.jes.2019.02.025>.
- Osawaa, R.A., Barrocas, B.T., Monteiro, O.C., Oliveira, M.C., Florêncio, M.H., 2020. Visible light photocatalytic degradation of amitriptyline using cobalt doped titanate nano-wires: kinetics and characterization of transformation products. *J. Environ. Chem. Eng.* 8, 103585. <https://doi.org/10.1016/j.jece.2019.103585>.
- Ozamiz-Etxebarria, N., Dosil-Santamaria, M., Picaza-Gorrochategui, M., Idoiaga-Mondragon, N., 2020. Stress, anxiety, and depression levels in the initial stage of the COVID-19 outbreak in a population sample in the northern Spain. *Cad. Saude Publ.* 36, 1–9. <https://doi.org/10.1590/0102-311X00054020>.
- Paíga, P., Santos, L.H.M.L.M., Ramos, S., Jorge, S., Silva, J.G., Delerue-Matos, C., 2016. Presence of pharmaceuticals in the Lis river (Portugal): sources, fate and seasonal variation. *Sci. Total Environ.* 573, 164–177. <https://doi.org/10.1016/j.scitotenv.2016.08.089>.
- Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V.G., Papoutsis, E., Katsaounou, P., 2020. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Brain Behav. Immun.* 1–7. <https://doi.org/10.1016/j.bbi.2020.05.026>.
- Parrott, J.L., Metcalfe, C.D., 2019. Assessing the effects of environmentally relevant concentrations of antidepressant mixtures to fathead minnows exposed over a full life cycle. *Sci. Total Environ.* 648, 1227–1236. <https://doi.org/10.1016/j.scitotenv.2018.08.237>.
- Pearlstein, T., 2016. Treatment of premenstrual dysphoric disorder: therapeutic challenges. *Expert. Rev. Clin. Pharmacol.* 9, 493–496. <https://doi.org/10.1586/17512433.2016.1142371>.
- Peña-Guzmán, C., Ulloa-Sánchez, S., Mora, K., Helena-Bustos, R., Lopez-Barrera, E., Alvarez, J., Rodriguez-Pinzón, M., 2019. Emerging pollutants in the urban water cycle in Latin America: a review of the current literature. *J. Environ. Manag.* 237, 408–423. <https://doi.org/10.1016/j.jenvman.2019.02.100>.
- Peng, Y., Gautam, L., Hall, S.W., 2019a. The detection of drugs of abuse and pharmaceuticals in drinking water using solid-phase extraction and liquid chromatography-mass spectrometry. *Chemosphere* 223, 438–447. <https://doi.org/10.1016/j.chemosphere.2019.02.040>.

- Peng, Y.N., Huang, M.L., Kao, C.H., 2019b. Prevalence of depression and anxiety in colorectal cancer patients: a literature review. *Int. J. Environ. Res. Public Health* 16. <https://doi.org/10.3390/ijerph16030411>.
- Pérez, P.D., Ma, Z., Hamilton, C., Sánchez, C., Mørk, A., Pehrson, A.L., Bundgaard, C., Zhang, N., 2018. Acute effects of vortioxetine and duloxetine on resting-state functional connectivity in the awake rat. *Neuropharmacology* 128, 379–387. <https://doi.org/10.1016/j.neuropharm.2017.10.038>.
- Petrie, B., Barden, R., Kasprzyk-Hordern, B., 2015. A review on emerging contaminants in wastewaters and the environment: current knowledge, understudied areas and recommendations for future monitoring. *Water Res.* 72, 3–27. <https://doi.org/10.1016/j.watres.2014.08.053>.
- Petrović, M., Hernando, M.D., Díaz-Cruz, M.S., Barceló, D., 2005. Liquid chromatography-tandem mass spectrometry for the analysis of pharmaceutical residues in environmental samples: a review. *J. Chromatogr. A* 1067, 1–14. <https://doi.org/10.1016/j.chroma.2004.10.110>.
- Porseryd, T., Kellner, M., Reyhanian Caspillo, N., Volkova, K., Elabbas, L., Ullah, S., Olsén, H., Dinnézt, P., Porsch Hällström, I., 2017. Combinatory effects of low concentrations of 17A-etinylestradiol and citalopram on non-reproductive behavior in adult zebrafish (*Danio rerio*). *Aquat. Toxicol.* 193, 9–17. <https://doi.org/10.1016/j.aquatox.2017.10.001>.
- Prasertkulsak, S., Chiemchaisri, C., Chiemchaisri, W., Yamamoto, K., 2019. Removals of pharmaceutical compounds at different sludge particle size fractions in membrane bioreactors operated under different solid retention times. *J. Hazard. Mater.* 368, 124–132. <https://doi.org/10.1016/j.jhazmat.2019.01.050>.
- Ramirez-Mendoza, R.A., Morales-Menendez, R., Melchor-Martinez, E.M., Iqbal, H.M., Parra-Arroyo, L., Vargas-Martínez, A., Parra-Saldivar, R., 2020. Incorporating the sustainable development goals in engineering education. *Int. J. Interact. Des. Manuf. (IJIDeM)* 14, 739–745.
- Ramírez-Morales, D., Masis-mora, M., Montiel-, J.R., Cambronero-heinrichs, J.C., Briceño-, S., Rojas-Sánchez, C.E., Méndez-Rivera, M., Arias-Mora, V., Tormo-Budowski, R., Brenes, L., Rodríguez-Rodríguez, C.E., 2020. Occurrence of pharmaceuticals, hazard assessment and ecotoxicological evaluation of WWTPs in Costa Rica Didier. *Sci. Total Environ.*, 141200 <https://doi.org/10.1016/j.scitotenv.2020.141200>.
- Ransing, R., Kukreti, P., Deshpande, S., Godake, S., Neelam, N., Raghuveer, P., Mahadevaiah, M., Kataria, D., Patil, S., Puri, M., Padma, K., 2020. Perinatal depression–knowledge gap among service providers and service utilizers in India. *Asian J. Psychiatr.* 47, 101822. <https://doi.org/10.1016/j.ajp.2019.10.002>.
- Real, F.J., Benítez, J.F., Acero, J.L., Casas, F., 2015. Comparison between chlorination and ozonation treatments for the elimination of the emerging contaminants amitriptyline hydrochloride, methyl salicylate and 2-phenoxyethanol in surface waters and secondary effluents. *J. Chem. Technol. Biotechnol.* 90, 1400–1407. <https://doi.org/10.1002/jctb.4441>.
- Ren, X., Yu, S., Dong, W., Yin, P., Xu, X., Zhou, M., 2020. Burden of depression in China, 1990–2017: findings from the global burden of disease study 2017. *J. Affect. Disord.* 268, 95–101. <https://doi.org/10.1016/j.jad.2020.03.011>.

- Richardson, S.D., 2012. Environmental mass spectrometry: emerging contaminants and current issues. *Anal. Chem.* 84, 747–778. <https://doi.org/10.1021/ac202903d>.
- Rimayi, C., Odusanya, D., Weiss, J.M., de Boer, J., Chimuka, L., 2018. Contaminants of emerging concern in the Hartbeespoort Dam catchment and the uMngeni River estuary 2016 pollution incident, South Africa. *Sci. Total Environ.* 627, 1008–1017. <https://doi.org/10.1016/j.scitotenv.2018.01.263>.
- Rodrigues, A., Borges, F.O., Pissarra, V., Luísa Maulvault, A., Paula, J.R., Bispo, R., Rosa, R., 2019. First indication of deleterious impacts in white-seabream larvae (*Diplodus sargus*) survival and behaviour following acute venlafaxine exposure. *Ecotoxicology* 28, 612–618. <https://doi.org/10.1007/s10646-019-02057-7>.
- Rodrigues, P., Cunha, V., Oliva-Teles, L., Ferreira, M., Guimarães, L., 2020. Norfluoxetine and venlafaxine in zebrafish larvae: single and combined toxicity of two pharmaceutical products relevant for risk assessment. *J. Hazard. Mater.* 400. <https://doi.org/10.1016/j.jhazmat.2020.123171>.
- Rojó, M., Álvarez-Muñoz, D., Dománico, A., Foti, R., Rodríguez-Mozaz, S., Barceló, D., Carriquiriborde, P., 2019. Human pharmaceuticals in three major fish species from the Uruguay River (South America) with different feeding habits. *Environ. Pollut.* 252, 146–154. <https://doi.org/10.1016/j.envpol.2019.05.099>.
- Ros, N., Lomba, L., Pilar Ribate, M., Zuriaga, E., B. García, C., Giner, B., 2018. Acute lethal and sublethal effects of diltiazem and doxepin for four aquatic environmental bioindicators covering the trophic chain. *AIMS Environ. Sci.* 5, 229–243. <https://doi.org/10.3934/environsci.2018.4.229>.
- Saaristo, M., Lagesson, A., Bertram, M.G., Fick, J., Klaminder, J., Johnstone, C.P., Wong, B.B.M., Brodin, T., 2019. Behavioural effects of psychoactive pharmaceutical exposure on European perch (*Perca fluviatilis*) in a multi-stressor environment. *Sci. Total Environ.* 655, 1311–1320. <https://doi.org/10.1016/j.scitotenv.2018.11.228>.
- Saka, C., 2017. An overview of analytical methods for the determination of monoamine oxidase inhibitors in pharmaceutical formulations and biological fluids. *Crit. Rev. Anal. Chem.* 47, 1–23. <https://doi.org/10.1080/10408347.2014.964835>.
- de Santiago-Martín, A., Meffe, R., Teijón, G., Martínez Hernández, V., López-Heras, I., Alonso Alonso, C., Arenas Romasanta, M., de Bustamante, I., 2020. Pharmaceuticals and trace metals in the surface water used for crop irrigation: risk to health or natural attenuation? *Sci. Total Environ.* 705. <https://doi.org/10.1016/j.scitotenv.2019.135825>.
- Santos, L.H.M.L.M., Maulvault, A.L., Jaén-Gil, A., Marques, A., Barceló, D., Rodríguez-Mozaz, S., 2020. Insights on the metabolism of the antidepressant venlafaxine by meagre (*Argyrosomus regius*) using a combined target and suspect screening approach. *Sci. Total Environ.* 737, 140226. <https://doi.org/10.1016/j.scitotenv.2020.140226>.
- Saraghi, M., Golden, L.R., Hersh, E.V., 2017. Anesthetic considerations for patients on antidepressant therapy—part I. *Anesth. Prog.* 64, 253–261. <https://doi.org/10.2344/anpr-64-04-14>.
- Schultz, M.M., Furlong, E.T., Kolpin, D.W., Werner, S.L., Schoenfuss, H.L., Barber, L.B., Blazer, V.S., Norris, D.O., Vajda, A.M., 2010. Antidepressant pharmaceuticals in two U.S. effluent-impacted streams: occurrence and fate in water and sediment and selective uptake

- in fish neural tissue. *Environ. Sci. Technol.* 44, 1918–1925. <https://doi.org/10.1021/es9022706>.
- Sehonova, P., Plhalova, L., Blahova, J., Doubkova, V., Marsalek, P., Prokes, M., Tichy, F., Skladana, M., Fiorino, E., Mikula, P., Vecerek, V., Faggio, C., Svobodova, Z., 2017. Effects of selected tricyclic antidepressants on early-life stages of common carp (*Cyprinus carpio*). *Chemosphere* 185, 1072–1080. <https://doi.org/10.1016/j.chemosphere.2017.07.092>.
- Sehonova, P., Hodkovicova, N., Urbanova, M., Örn, S., Blahova, J., Svobodova, Z., Faldyna, M., Chloupek, P., Briedikova, K., Carlsson, G., 2019. Effects of antidepressants with different modes of action on early life stages of fish and amphibians. *Environ. Pollut.* 254. <https://doi.org/10.1016/j.envpol.2019.112999>.
- Shamsipur, M., Mirmohammadi, M., 2014. High performance liquid chromatographic determination of ultra traces of two tricyclic antidepressant drugs imipramine and trimipramine in urine samples after their dispersive liquid-liquid microextraction coupled with response surface optimization. *J. Pharm. Biomed. Anal.* 100, 271–278. <https://doi.org/10.1016/j.jpba.2014.08.008>.
- Sharma, B., 2017. Antidepressants: mechanism of action, toxicity and possible amelioration. *J. Appl. Biotechnol. Bioeng.* 3, 437–448. <https://doi.org/10.15406/jabb.2017.03.00082>.
- Sheng, L.H., Chen, H.R., Huo, Y. Bin, Wang, J., Zhang, Y., Yang, M., Zhang, H.X., 2014. Simultaneous determination of 24 antidepressant drugs and their metabolites in wastewater by ultra-high performance liquid chromatography-tandem mass spectrometry. *Molecules* 19, 1212–1222. <https://doi.org/10.3390/molecules19011212>.
- Sheridan, D.C., Lin, A., Zane Horowitz, B., 2018. Suicidal bupropion ingestions in adolescents: increased morbidity compared with other antidepressants. *Clin. Toxicol.* 56, 360–364. <https://doi.org/10.1080/15563650.2017.1377839>.
- Shi, W., Han, Y., Guan, X., Rong, J., Su, W., Zha, S., Tang, Y., Du, X., Liu, G., 2019. Fluoxetine suppresses the immune responses of blood clams by reducing haemocyte viability, disturbing signal transduction and imposing physiological stress. *Sci. Total Environ.* 683, 681–689. <https://doi.org/10.1016/j.scitotenv.2019.05.308>.
- Shi, W., Han, Y., Sun, S., Tang, Y., Zhou, W., Du, X., Liu, G., 2020. Immunotoxicities of microplastics and sertraline, alone and in combination, to a bivalve species: size-dependent interaction and potential toxication mechanism. *J. Hazard. Mater.* 396, 122603. <https://doi.org/10.1016/j.jhazmat.2020.122603>.
- Silva, B., Costa, F., Neves, I.C., Tavares, T., 2015. Psychiatric Pharmaceuticals as Emerging Contaminants in Wastewater. <https://doi.org/10.1007/978-3-319-20493-2>.
- Skapinakis, P., Caldwell, D.M., Hollingworth, W., Bryden, P., Fineberg, N.A., Salkovskis, P., Welton, N.J., Baxter, H., Kessler, D., Churchill, R., Lewis, G., 2016. Pharmacological and psychotherapeutic interventions for management of obsessive-compulsive disorder in adults: a systematic review and network meta-analysis. *Lancet Psychiatry* 3, 730–739. [https://doi.org/10.1016/S2215-0366\(16\)30069-4](https://doi.org/10.1016/S2215-0366(16)30069-4).
- Smith, T.T., Schaff, M.B., Rupprecht, L.E., Schassburger, R.L., Buffalari, D.M., Murphy, S.E., Sved, A.F., Donny, E.C., 2015. Effects of MAO inhibition and a combination of minor alkaloids, β -carbolines, and acetaldehyde on nicotine self-administration in adult male rats. *Drug Alcohol Depend.* 155, 243–252. <https://doi.org/10.1016/j.drugalcdep.2015.07.002>.

- Smith, L., Jacob, L., Yakkundi, A., McDermott, D., Armstrong, N.C., Barnett, Y., López-Sánchez, G.F., Martin, S., Butler, L., Tully, M.A., 2020. Correlates of symptoms of anxiety and depression and mental wellbeing associated with COVID-19: a cross-sectional study of UK-based respondents. *Psychiatry Res.* 291, 113138. <https://doi.org/10.1016/j.psychres.2020.113138>.
- Solagaistua, L., de Guzmán, I., Barrado, M., Mijangos, L., Etxebarria, N., García-Baquero, G., Larrañaga, A., von Schiller, D., Elosegui, A., 2018. Testing wastewater treatment plant effluent effects on microbial and detritivore performance: a combined field and laboratory experiment. *Aquat. Toxicol.* 203, 159–171. <https://doi.org/10.1016/j.aquatox.2018.08.006>.
- Sparkman, O.D., Penton, Z.E., Kitson, F.G., 2011. Gas chromatography. In: Kitson, F.G., Larsen, B.S., McEwen, C.N. (Eds.), *Gas Chromatography and Mass Spectrometry: A Practical Guide*, pp. 15–83 <https://doi.org/10.1016/b978-0-12-373628-4.00002-2>.
- Subramaniam, R., Östin, A., Nilsson, C., Åstot, C., 2013. Direct derivatization and gas chromatography-tandem mass spectrometry identification of nerve agent bio-markers in urine samples. *J. Chromatogr. B Anal. Technol. Biomed. Life Sci.* 928, 98–105. <https://doi.org/10.1016/j.jchromb.2013.03.009>.
- Tahmasbi, H., Khoshayand, M.R., Bozorgi-Koushalshahi, M., Heidary, M., Ghazi-Khansari, M., Faramarzi, M.A., 2016. Biocatalytic conversion and detoxification of imipramine by the laccase-mediated system. *Int. Biodeterior. Biodegrad.* 108, 1–8. <https://doi.org/10.1016/j.ibiod.2015.11.029>.
- Tan, H., Polverino, G., Martin, J.M., Bertram, M.G., Wiles, S.C., Palacios, M.M., Bywater, C.L., White, C.R., Wong, B.B.M., 2020. Chronic exposure to a pervasive pharmaceutical pollutant erodes among-individual phenotypic variation in a fish. *Environ. Pollut.* 263, 114450. <https://doi.org/10.1016/j.envpol.2020.114450>.
- Tanoue, R., Margiotta-Casaluci, L., Huerta, B., Runnalls, T.J., Eguchi, A., Nomiyama, K., Kunisue, T., Tanabe, S., Sumpter, J.P., 2019. Protecting the environment from psychoactive drugs: problems for regulators illustrated by the possible effects of tramadol on fish behaviour. *Sci. Total Environ.* 664, 915–926. <https://doi.org/10.1016/j.scitotenv.2019.02.090>.
- Thiebault, T., Boussafir, M., 2019. Adsorption mechanisms of psychoactive drugs onto montmorillonite. *Colloids Interf. Sci. Commun.* 30, 100183. <https://doi.org/10.1016/j.colcom.2019.100183>.
- Togola, A., Budzinski, H., 2008. Multi-residue analysis of pharmaceutical compounds in aqueous samples. *J. Chromatogr. A* 1177, 150–158. <https://doi.org/10.1016/j.chroma.2007.10.105>.
- Twenge, J.M., 2020. Why increases in adolescent depression may be linked to the technological environment. *Curr. Opin. Psychol.* 32, 89–94. <https://doi.org/10.1016/j.copsyc.2019.06.036>.
- UNESCO, 2020. Emerging pollutants in water and wastewater. Retrieved from. <https://en.unesco.org/emergingpollutantsinwaterandwastewater>.
- Vaclavik, J., Sehonova, P., Hodkovicova, N., Vecerkova, L., Blahova, J., Franc, A., Marsalek, P., Mares, J., Tichy, F., Svobodova, Z., Faggio, C., 2020. The effect of foodborne sertraline on rainbow trout (*Oncorhynchus mykiss*). *Sci. Total Environ.* 708, 135082. <https://doi.org/10.1016/j.scitotenv.2019.135082>.

- Valimaña-Traverso, J., Amariei, G., Boltes, K., García, M.Á., Marina, M.L., 2019a. Stability and toxicity studies for duloxetine and econazole on *Spirodela polyrhiza* using chiral capillary electrophoresis. *J. Hazard. Mater.* 374, 203–210. <https://doi.org/10.1016/j.jhazmat.2019.04.027>.
- Valimaña-Traverso, J., Amariei, G., Boltes, K., García, M.Á., Marina, M.L., 2019b. Enantiomer stability and combined toxicity of duloxetine and econazole on *Daphnia magna* using real concentrations determined by capillary electrophoresis. *Sci. Total Environ.* 670, 770–778. <https://doi.org/10.1016/j.scitotenv.2019.03.208>.
- Varigonda, A.L., Jakubovski, E., Bloch, M.H., 2016. Systematic review and meta-analysis: early treatment responses of selective serotonin reuptake inhibitors and clomipramine in pediatric obsessive-compulsive disorder. *J. Am. Acad. Child Adolesc. Psychiatry* 55, 851–859.e2. <https://doi.org/10.1016/j.jaac.2016.07.768>.
- Voloshenko-Rossin, A., Gasser, G., Cohen, K., Gun, J., Cumbal-Flores, L., Parra-Morales, W., Sarabia, F., Ojeda, F., Lev, O., 2015. Emerging pollutants in the Esmeraldas watershed in Ecuador: discharge and attenuation of emerging organic pollutants along the San Pedro-Guayllabamba-Esmeraldas rivers. *Environ Sci Process Impacts* 17, 41–53. <https://doi.org/10.1039/c4em00394b>.
- Wang, Z., Gao, S., Dai, Q., Zhao, M., Yang, F., 2020. Occurrence and risk assessment of psychoactive substances in tap water from China. *Environ. Pollut.* 261, 114163. <https://doi.org/10.1016/j.envpol.2020.114163>.
- Wu, M., Xiang, J., Chen, F., Fu, C., Xu, G., 2017. Occurrence and risk assessment of antidepressants in Huangpu River of Shanghai, China. *Environ. Sci. Pollut. Res.* 24, 20291–20299. <https://doi.org/10.1007/s11356-017-9293-x>.
- Xiang, M., Jiang, Y., Hu, Z., Yang, Y., Du, X., Botchway, B.O., Fang, M., 2019. Serotonin receptors 2A and 1A modulate anxiety-like behavior in post-traumatic stress disordered mice. *Am. J. Transl. Res.* 11, 2288–2303.
- Xie, P., Zou, Y., Jiang, S., Wang, J., Zhang, L., Wang, Z., Yue, S., Feng, X., 2019. Degradation of imipramine by vacuum ultraviolet (VUV) system: influencing parameters, mechanisms, and variation of acute toxicity. *Chemosphere* 233, 282–291. <https://doi.org/10.1016/j.chemosphere.2019.05.201>.
- Yang, M., Qiu, W., Chen, J., Zhan, J., Pan, C., Lei, X., Wu, M., 2014. Growth inhibition and coordinated physiological regulation of zebrafish (*Danio rerio*) embryos upon sublethal exposure to antidepressant amitriptyline. *Aquat. Toxicol.* 151, 68–76. <https://doi.org/10.1016/j.aquatox.2013.12.029>.
- Yang, H., Lu, G., Yan, Z., Liu, J., Dong, H., 2018. Influence of suspended sediment characteristics on the bioaccumulation and biological effects of citalopram in *Daphnia magna*. *Chemosphere* 207, 293–302. <https://doi.org/10.1016/j.chemosphere.2018.05.091>.
- Yang, H., Lu, G., Yan, Z., Liu, J., Dong, H., Bao, X., Zhang, X., Sun, Y., 2020. Residues, bioaccumulation, and trophic transfer of pharmaceuticals and personal care products in highly urbanized rivers affected by water diversion. *J. Hazard. Mater.* 391, 122245. <https://doi.org/10.1016/j.jhazmat.2020.122245>.
- Yonkers, K.A., Simoni, M.K., 2018. Premenstrual disorders: an expert review. *Am. J. Obstet. Gynecol.* 218, 68–74. <https://doi.org/10.1016/j.ajog.2017.05.045>.

- Zhu, S., Wu, G., Gu, L., Sun, Y., Zhang, L., Huang, Y., Lyu, K., Yang, Z., 2020. Antidepressant sertraline impairs the induced morphological defense of *Ceriodaphnia cornuta* in response to *Chaoborus* larvae kairomone. *Environ. Pollut.* 266, 115092. <https://doi.org/10.1016/j.envpol.2020.115092>.
- Ziarrusta, H., Mijangos, L., Prieto, A., Etxebarria, N., Zuloaga, O., Olivares, M., 2016. Determination of tricyclic antidepressants in biota tissue and environmental waters by liquid chromatography-tandem mass spectrometry. *Anal. Bioanal. Chem.* 408, 1205–1216. <https://doi.org/10.1007/s00216-015-9224-y>.
- Ziarrusta, H., Ribbenstedt, A., Mijangos, L., Picart-Armada, S., Perera-Lluna, A., Prieto, A., Izagirre, U., Benskin, J.P., Olivares, M., Zuloaga, O., Etxebarria, N., 2019. Amitriptyline at an environmentally relevant concentration alters the profile of metabolites beyond monoamines in gilt-head bream. *Environ. Toxicol. Chem.* 38, 965–977. <https://doi.org/10.1002/etc.4381>.
- Ziegler, M., Knoll, S., Köhler, H.R., Tisler, S., Huhn, C., Zwiener, C., Triebkorn, R., 2020. Impact of the antidepressant citalopram on the behaviour of two different life stages of brown trout. *PeerJ* 2020. <https://doi.org/10.7717/peerj.8765>.

For the missing Tables 1-3, see original publication here: Castillo-Zacarías, Carlos, Mario E. Barocio a, Enrique Hidalgo-Vázquez, Juan Eduardo Sosa-Hernández, Lizeth Parra-Arroyo, Itzel Y. López-Pacheco, Damià Barceló, Hafiz N.M. Iqbal, Roberto Parra-Saldívar. “Antidepressant drugs as emerging contaminants: Occurrence in urban and non-urban waters and analytical methods for their detection.” *Science of the Total Environment* 757 (2021): 1-16. Available at: <https://drive.google.com/file/d/1eH6ejjf5NDIDEAZv9WgwKGMMaPWTwtZg/view>

The Fight to Save Guatemala's Maya Nature Reserve from Drug Gangs

by William Allen

Central America's largest expanse of intact rainforest is under threat from organised crime

The 200-foot summit of Temple IV in the ancient Maya city of Tikal provides a spectacular view of Central America's largest expanse of intact rainforest. In the late afternoon, spider monkeys dangle from nearby branches, stretching to pick small fruits. The guttural barks of howler monkeys echo through the canopy — a lush green broken only by the occasional flash of lemon yellow from a swooping toucan.

This lowland forest is the heart of the Maya Biosphere Reserve of northern Guatemala, a 2.1 million-hectare (5.2 million-acre) sanctuary that covers 19 percent of the country and contains roughly 60 percent of its protected area. The UNESCO-designated biosphere reserve sustains a wide array of biodiversity, most notably the last remaining population of a key subspecies of scarlet macaw.

But this magnificent creature and others that inhabit the reserve—jaguars, pumas, Guatemalan black howler monkeys, Baird's tapirs—are being pressured not just by the standard threats common to tropical regions, such as illegal logging, fires, and commercial hunting. Even more virulent forces are gnawing away at the Maya Biosphere Reserve, including Mexican drug cartels that cut into the forest to build airstrips to transport drugs, Salvadoran gangs that carve out huge cattle ranches to launder drug money, and Chinese organized crime groups moving their illegal logging network toward the reserve to supply Asian markets with prime tropical hardwoods.

As a result, this natural and cultural treasure—the heart of the Selva Maya, a forest spanning the borders of Guatemala, Mexico, and Belize—has in recent years effectively been cut in two. The western side, which includes two of the reserve's five national parks and is bordered on the west and the north by Mexico, is under siege, according to Guatemalan park officials. The eastern part of the reserve, where Tikal rises above the jungle canopy and which borders Belize, is lush and intact.

“The story of the Maya Biosphere Reserve has increasingly become a tale of two reserves—one of conservation successes and one of failures,” says Roan McNab, director of the New York-based Wildlife Conservation Society's (WCS) Guatemala program. McNab is a pivotal figure in a coalition of Guatemalan and foreign conservation groups battling to preserve the eastern half of the reserve and claw back some of the denuded lands of the western sector.

Much is at stake, as the reserve and the surrounding Selva Maya are the largest block of intact forest north of the Amazon Basin. The reserve supports 513 of Guatemala's bird species (71 percent of the national total), 122 mammal species (64 percent), 95 reptile species (39 percent),

and more than 80 species of neotropical migrant birds from North America. It enshrouds Tikal, a national park and World Heritage Site, and hundreds of other vestiges of Mayan civilization.

The international coalition struggling to preserve the heart of the reserve has enjoyed some important successes. Scarlet macaws are making a comeback thanks to intensive restoration efforts. The presence of the civilian government and military has grown. Prosecution of environmental crimes is up, albeit slightly. And community-based forest concessions have brought some rural Guatemalans sustainable income and empowered them in managing parts of the reserve.

“There’s a greater social awareness now of the importance of preserving environmental stability,” says Rolman Hernandez, director of the Petén region of Consejo Nacional de Areas Protegidas (CONAP), the Guatemalan park service. The reserve covers more than half of the Petén, the largest and northernmost of Guatemala’s 22 departments, or provinces.

The region that became the Maya Biosphere Reserve was once a vast mix of lowland rainforest, wetlands, lagoons, lakes, rivers, and mangrove forests. As many as 2 million people lived here at the peak of Mayan civilization, around 800 A.D., archeologists estimate. Then came the Mayan decline and Spanish conquest.

Until the 1960s, the region consisted of a few isolated forest villages. Then roads, built mainly to access oil and timber, opened the area to illegal colonization and slash-and-burn agriculture. The reserve was created in 1990 to help control deforestation, but CONAP, financially strapped and often overruled by government officials friendly to the ranchers, has been hampered in its attempts to control the wave of destruction, McNab and others say. Today the human population is 118,000, with most living in poverty.

Criminal activity in the area began to intensify a decade ago, further accelerating the destruction of the western half of the reserve. An important factor is that northern Guatemala is ideally situated to refuel drug aircraft flying from South America and transfer narcotics to trucks for the easy drive to Mexico. The cartels operated in a “climate of impunity” since the army and police lacked the power to take them on, McNab says. The ranchers built dozens of airstrips, including one dubbed the “international airport,” which had three runways and more than a dozen abandoned aircraft. The result was a loss of 40,000 hectares of forest.

Guatemalans have developed a new term for what’s happening in the region: *narcoganaderia*, a combination of the Spanish words for drugs and cattle ranching. The cartels launder drug money by investing in cattle production and reaping profits from cattle sales in Mexican markets.

CONAP officials say evidence of the work of Chinese-backed criminal groups lies in the yard behind the agency’s Petén headquarters, in San Benito. The yard is crowded with timber and confiscated vehicles. Victor Penados, CONAP’s coordinator of control and vigilance for the reserve, points to a pile of rosewood confiscated from suppliers to Chinese criminal groups. The wood comes from one of several recent timber-smuggling busts by the government reported in national news media. This pile, confiscated from a truck delivering the wood to the Caribbean seaport of Puerto San Tomas de Castillo for shipment to China, has a market value of \$125,000, Penados estimates.

Operatives with Chinese criminal cartels have been conducting illegal logging just south of the reserve, according to CONAP. McNab fears it won’t be long before the Chinese-backed groups start cutting inside the reserve itself and then turn to intensive jaguar poaching for body parts to serve a Chinese market that is already driving Asian big cats toward extinction.

This conservation drama is playing out under extreme conditions. CONAP and WCS staffers have been threatened many times. Some have been taken hostage, while others have had to “disappear” for several weeks after raids to reclaim illegally acquired ranchland. McNab himself was held at gunpoint by two looters of a Mayan ruin deep in the jungle. I was accompanied into the forest with as many as five armed security guards as we traveled near cartel ranches. Always in the back of my mind were the nation’s poverty, corruption, history of dictatorship, lawlessness, and 36-year civil war, which ended in 1996.

The influence of illegal logging and ranching in the reserve is evident in a series of three CONAP land-use maps showing a wave of fires and land clearing that gobbled up large green swaths of forest from 2000 to 2011, especially in the western section. McNab warns that if law enforcement does not improve, the reserve faces a “chain of falling dominoes threatening to sweep eastward all the way to Guatemala’s border with Belize.”

Nowhere is the tale of two reserves more visible than at the Guacamayas Biological Station in Laguna del Tigre National Park. To the south, across the Rio San Pedro and beyond, stretches a vast plain of ranchland, the raw result of deforestation. To the north, the rainforest canopy rolls untattered all the way to the border with Mexico. In 2008, scientists discovered a 1,100-hectare clear-cut smack in the middle of that expanse. It turned out to be a large cattle ranch linked to a Salvadoran gang involved in drug trafficking.

Such forest destruction has in recent decades reduced by 75 percent the habitat of the region’s scarlet macaws, a subspecies of the scarlet macaws found farther south in Latin America and the last remaining macaws in the wild in Guatemala. By 2000, scarlet macaws had nearly been extirpated in the reserve. A 2003 WCS study estimated that the population, mostly centered in the forest to the east of Laguna del Tigre park, had dropped to 200 birds. That year, the researchers monitored 15 nests, but only one chick successfully fledged.

But a program of predator control, environmental education in local schools, and hand-rearing by veterinarians brought the number of successful macaw fledglings to 29 in 2011 and 49 for this year’s nesting season. Says McNab, “We feel pretty good about adding that number of birds to the population. That’s big in terms of saving the species.”

To halt continuing deforestation, CONAP and its allies have established what they call “the Shield”—a lattice of trails running along the eastern border of Laguna del Tigre park, anchored by three major bases for patrols by CONAP, the army, national police, and others. Patrols and arrests have risen steadily over the past four years.

If the success or failure of the Shield will determine whether the western front of the reserve holds, what happens in villages like Uaxactún will decide whether the eastern part will avoid destruction from within.

Uaxactún, population 280, is one of 14 villages awarded government concessions more than a decade ago as part of an experiment in community-based forest management. The concessions, covering nearly one-fourth of the reserve, require residents to protect the forest ecosystem and manage its wood and other resources sustainably.

The villagers must refrain from poaching, intensive logging, slash-and-burn farming, and other unsustainable practices, as well as patrol for and report any such illegal activity. In return, CONAP, WCS, and other groups provide technical and financial support for forest-product ventures. Dozens of residents now work in sustainable harvesting of timber, date palm fronds, chicle for chewing gum, and other non-timber products from the forest. Others work in the village sawmill and woodworking shop.

Village leaders say the concession is working well. But not all the concessions have been so successful, according to a study published in March in the journal *Forest Ecology and Management*. Among reasons for the problems were limited funding, the low CONAP budget, pressure from illegal ranching, and land speculation.

The effort in the village of Cruce a la Colorada was one of the failures. In 2010, disputes between ranchers and concession managers became so heated that concession members received death threats. A community leader was assassinated. In the ensuing climate of fear, the project collapsed.

But the conservation groups remain hopeful.

“You can grapple with these governance issues and you can have success,” McNab says. “It takes an integrated strategy working with a huge suite of partners, but it can be done.”

Previously published as: Allen, William. “The fight to save Guatemala’s Maya nature reserve from drug gangs.” *The Guardian*. 8 October 2012.

<https://www.theguardian.com/environment/2012/oct/08/guatemala-maya-nature-reserve-drug-gangs>

Deforestation and Pollution

by Witness for Peace

One of the frequently overlooked costs of the war on drugs is its negative impact on the environment—mainly resulting from aerial spraying of drug crops in ecologically sensitive environments such as the Andes and Amazon basin. Chemical eradication efforts not only cause localised deforestation, but also have a devastating multiplier effect because drug producers simply deforest new areas for cultivation—the so-called ‘balloon effect.’ This problem is made worse because protected areas in national parks where aerial spraying is banned are often targeted.

Illicit unregulated drug production is also associated with localised pollution, as toxic chemicals used in crude processing of coca and opium are disposed of in local environments and waterways.

Despite millions of hectares of coca being eradicated since the 1980s, overall production has easily kept pace with rising demand – even if it has moved from one region to another

- *“600 million litres of so-called precursor chemical are used annually in South America for cocaine production. To increase yields, coca growers use highly poisonous herbicides and pesticides, including paraquat. Processors also indiscriminately discard enormous amounts of gasoline, kerosene, sulphuric acid, ammonia, sodium bicarbonate, potassium carbonate, acetone, ether and lime onto the ground and into nearby waterways”*

– John Walters, US Drug Tsar¹¹⁹

- *“The drug war has tried in vain to keep cocaine out of people’s noses, but could result instead in scorching the lungs of the earth.”*

– Sanho Tree, Director of the Institute for Policy Studies, Drug Policy Project, ‘Shoveling Water’, 2009.¹²⁰

Previously posted online at: Witness for Peace. “Deforestation and pollution.” *Count the Costs*. 2016. <https://web.archive.org/web/20170225135327/http://countthecosts.org/seven-costs/deforestation-and-pollution>

¹¹⁹ Walters, J., “The Other Drug War,” Oped, *The Oregonian* (Portland), 22 April, 2002.

¹²⁰

Shoveling

<https://web.archive.org/web/20160701193049/http://evolvecms.webfreelancersuk.co.uk/resource-library/shoveling-water>

Water,

The War on Drugs in Colombia: The Environment, the Treadmill of Destruction and Risk-Transfer Militarism

by Chad L. Smith, Gregory Hooks, and Michael Lengefeld

Abstract

Ecological damage, including global climate change, is commonly connected to practices and behaviors associated with economic activity and the Treadmill of Production (ToP). Less attention is paid to the connection between the military and environmental degradation, but recently the Treadmill of Destruction (ToD) has been documented as a global phenomenon with negative environmental effects. The ToD directly and indirectly contributes to environmental problems on many fronts, but one of the least obvious means by which the U.S. military influences the environment is through its policies supporting the “war on drugs.” The U.S. military aids Latin American countries, particularly Colombia, in the war on drugs in a number of capacities, including military support and training, weaponry, fumigation of crops, and logistical and surveillance support. The effort of the United States to curb the proliferation of illegal drug crops in Colombia is the most direct role that the military has played in this effort. Within the context of the “war on drugs” the United States is now engaged in risk-transfer militarism in which the consequences of this military action are borne by the Global South. We document the scope, magnitude, and consequences of the ToD in the war on drugs and the ways it negatively impacts the environment. Our argument reframes the ToD by emphasizing the role of risk-transfer militarism within the emergence of “new” wars as represented in the case of Colombia.

Introduction

In this article, we document the manner in which the militarized “war on drugs” waged by the United States contributes to environmental degradation in Colombia. The U.S. involvement includes military support and training, weaponry, fumigation of crops, and logistical and surveillance support. In addition to documenting the scope and magnitude of this militarized war on drugs in the Colombian Andes, we assess its impact on the environment, most notably with respect to deforestation and climate change. Our goals are two-fold: first, we pinpoint the spatial, historical, and social dimension of the treadmill of destruction in Colombia; second, we utilize the case of Colombia’s war on drugs and its connections to the treadmill of destruction in order to contextualize several nascent developments, namely the emergence of risk-transfer militarism and the “new” wars of the 21st century.

“Catastrophic convergence” (Parenti 2011) is the collision of multiple social, economic and environmental catastrophes (poverty, violence, climate change) playing out

in the tropics of the Global South. Parenti describes the changing climate not only as the backdrop for these social and economic problems, but highlights an additional concern: climate change will exacerbate these problems and, thereby, produce a feedback loop. Parenti (2011: 8) contends that “Cold War-era militarism and the economic pathologies of neoliberalism” paved the way for this catastrophic convergence. Failed states can offer little institutional resistance to and are further weakened and delegitimized by the emergence of illegal trading of guns and illicit drugs. We believe that this militarized war on drugs contributes to the convergence Parenti has identified. Although our focus is upon the environmental costs borne by Colombia, it is clear that states, worldwide, are undergoing a series of crises. Chase-Dunn (2013) identifies the global scale of this crisis, and although we do not directly address all five of his “linked crises” we do think this case is reflective of this larger set of dynamics Chase-Dunn identifies.

In the pages that follow we situate the treadmill of destruction within the context of failed and struggling states with particular attention on the history of conflict in Colombia. We address the environmental and social effects that coca cultivation and the production of cocaine has in Colombia and, in turn, how efforts to curb its production, primarily through the U.S. policy of “Plan Colombia,” are problematic. As the metaphor of a treadmill suggests, the intensification of militarized drug production and destruction has resulted in an escalation of the accompanying environmental devastation. Finally, our argument reframes the treadmill of destruction by emphasizing the role of risk-transfer militarism within the emergence of “new” wars as represented in the case of Colombia.

Treadmills, Environmental Damage, and Failed States

The treadmill of production (ToP) is driven by commercial demands, primarily growth, market shares and profitability (Gould, Pellow and Schnaiberg 2008; Schnaiberg 1980; Schnaiberg and Gould 1994). The treadmill of destruction (ToD) is driven by the distinctive demands of geopolitics, militarism and war making. To highlight the distinctive effects of the ToD we begin with a discussion of the commercially oriented ToP stemming from the lucrative and globalized commodification of cocaine.

The ToP points to capitalist economic production as the driving force behind environmental damage. The treadmill refers to the relentless quest for economic growth and the high (and growing) levels of social inequality that result from this quest. With respect to the environment, the ToP makes unsustainable demands on the environment in the form of extraction of raw materials used in the production and distribution goods and in the form of waste.

When first developing the concept, Schnaiberg (1980) was largely focused on the United States. However, the ToP framework has been extended to shed light on processes operating at a transnational and global scale (Gould, Pellow and Schnaiberg 2008). Consideration of global commodity chains and the resulting unequal environmental exchange provides valuable insights into the transnational implications of the treadmill of production. Hopkins and Wallerstein (1982:159) define global commodity chains as “a network of labor and production processes whose end result is a finished commodity” (see also, Ciccantell and Smith 2009). Global commodity chains introduce demands from distant and powerful actors, disrupting and distorting local economic and social relationships, resulting in “unequal environmental exchanges” that impose steep environmental costs on vulnerable people and places (Rice 2007).

Clelland (2014), adopting a metaphor from physics, distinguishes between “bright” value and “dark” value. Physicists estimate that dark energy and dark matter account for the preponderance of the universe (more than 90%). “By analogy, that invisible human and natural energy flows are converted into the dark value that forms part of the basic structure of the world-system” (Clelland 2014: 85). Dark value is added in the periphery-externalized to workers, communities, households and ecosystems. The United Nations' Office on Drugs and Crime (2010: 170) estimates that a markup of roughly 30 times between coca derivatives (in the Andean producer states) and cocaine wholesale prices in the United States, and even more, 60 times, in Europe. Only a small portion of the spectacular street value of cocaine (its “bright” value) is derived from the risk (street violence and incarceration) confronted by organized criminal organizations that distribute cocaine in the Global North. The many externalities - ecological degradation and the coerced and undercompensated labor by Andean growers (cocaine's “dark” value) form the basis of cocaine's value. Ribot (1998), in a study of the commodity chain impacting Senegalese forestry, offers a reminder that securing access can be far more important than formal ownership in determining who profits. In the Andean regions of Colombia and especially the remote Amazonian regions where coca cultivation has spread in recent decades, access is often more important than nominal property rights. Without a formal title, squatters, guerrilla/paramilitary armies, and organized criminal networks take effective control of lands used for coca cultivation and coca processing. The prevalence of coercion in Colombian coca cultivation and processing contributes to the high rates of uncompensated negative externalities (unpaid labor by direct producers and ecological degradation), i.e., dark value.

The era of globalization—with the cheapening of transportation and communication—made possible the commodification of cocaine in the late-20th Century. The coca plant is indigenous and well adapted to the Andean region. As such, coca could be cultivated with few deleterious consequences for the environment. But the commodification of cocaine has set in motion powerful treadmill dynamics, sharply unequal environmental exchange, and widespread damage to the environment. Exacerbating this impact, a large number of ecological hotspots in the region have been severely damaged.

The Treadmill of Destruction and the “New” Wars of the 21st Century

With a focus on the United States in the 20th Century, Hooks and Smith (2004, 2005) introduced the “treadmill of destruction” by detailing the environmental dangers posed by the military. In this initial formulation, the understanding of the treadmill drew attention to the environmental degradation and inequality sustained by the world's leading military powers and fully professionalized military organizations. A number of scholars have extended the treadmill of destruction framework to consider its global reach (Clark and Jorgenson 2012; Jorgenson 2005; Jorgenson and Clark 2009; Jorgenson, Clark and Kentor 2010; Lengefeld and Smith 2013; York 2008). But this focus did not fully consider the growing ability of powerful nations to intervene in and shift the risk of war to less privileged peoples and less powerful nations. Moreover, this focus does not allow full consideration of the wars (and attendant environmental degradation) attributable to less formal (and less powerful) military organizations.

Arms races and wars generate and are sustained by a treadmill dynamic that is distinct from that driven by commercial competition. In the context of “old” wars (involving professionalized armed forces under the state’s control), acquiring and controlling territory loom large. Military forces routinely degrade the territory controlled by opposing forces, and battlefields remain toxic long after peace is declared. To cripple the war-making potential of adversaries, military forces degrade the industrial and agricultural assets controlled by opposing forces; this routinely entails widespread, significant, and deliberate environmental degradation (Hooks and Smith 2005). To understand the environmental footprint of the “new” wars of the 21st Century, the treadmill of destruction framework must be refined and updated. The world's most powerful nations are motivated to shift the risk of war to peoples and places of the Global South (Hooks and Smith 2012; Shaw 2002, 2005). At the same time, formal military organizations and the ability to sharply distinguish between combatants and noncombatants is less common in the “new” wars of the 21st Century. Instead, a wide range of armed organizations (e.g., guerrilla armies, temporary militias and organized criminal organizations of various size and capabilities, etc.) is playing a prominent role (Kaldor 1999). Finally, the control of territory is typically less important in “new” wars. Nonetheless, the environment is often degraded as these wars are pursued. To generate revenue to support privatized and less formal war making, military forces pursue unsustainable production and extractive efforts and maintain predatory relations with direct producers. These irresponsible practices are fueled by arms races and military competition; as the ferocity and stakes of military conflict accelerate so do the treadmill dynamics and the attendant impact on the environment.

War—defined broadly as organized violence by Kaldor (1999)—is and has been a social activity that builds on and reflects extant social relationships and structures. In the 19th and 20th Centuries, the world’s leading military powers maintained professionalized standing armies and navies. As such, waging war was monopolized by states and soldiers were sharply demarcated from the civilian population: “war made the state, and the state made war” (Tilly 1975: 142). The state as war maker remains intact for the United States and other major powers concentrated in the Global North. However, Shaw (2005) contends that the nations of the Global North, especially military powers such as the United States, are pursuing risk-transfer militarism. For the Global North, the homeland and citizens are shielded from the horrors of war and militarization because wars are fought on the terrain of vulnerable nations. If soldiers from the Global North are deployed, they fight from a distance, taking advantage of qualitatively superior military technologies. But the state’s monopoly over violence is not guaranteed.

In the new wars of the 21st Century, especially those fought in the Global South, a wide range of armed groups wage war. Instead, these wars “are characterized by a multiplicity of types of fighting units both public and private, state and non-state, or some kind of mixture” (Kaldor 1999: 92) of these various combinations of combatant units. In turn, the environmental degradation and inequality resulting from war - the treadmill of destruction - varies with the manner in which military forces are organized, how they are financed and the manner in which battles are fought. Table I summarizes key features of the “new” wars of the 21st Century and the environmental implications.

The Colombian case brings into sharp relief the new forms of war and associated assaults on the environment. As will be discussed in greater detail below, there have been a wide range of military forces operating in Colombia, including the Colombian military, organized criminal organizations, paramilitary forces allied with the government, anti-

government guerilla forces, and a variety of less formal and more transient (but still armed) fighting forces. The United States has participated directly and indirectly in this conflict, minimizing the risk to the United States' territory and personnel, while heightening the scale of violence in Colombia and surrounding countries.

Table 1. New Wars and New Dynamics to the Treadmill of Destruction

		“New” wars	
	“Old” wars (a)	Global North (b)	Global South (a)
Military forces	Professional (standing) army under the state's control	Professional forces under the state's control with use of mercenary forces to obscure culpability.	State lacks monopoly on means of coercion. Diverse military forces operate.
Patterns of violence	Pitched battles, war and peace demarcated by formal treaties. Soldiers suffer highest casualty rates	Risk-transfer militarism, military operations in Global South without formal declaration of war. Suffer very few casualties while relying on high-tech weaponry to inflict heavy losses on adversaries.	Violence deployed to achieve a variety of ends, including income generation, intimidation and genocide. Noncombatant casualties far exceed casualty rates among soldiers.
Financing violence	State taxation; state plays prominent role in fiscal management of economy	State taxation supports interventions by nations of the Global North; aid provided to allied but failed states in the Global South.	Legitimate economy often collapses. Predation by armed forces on non-combatants: resource exploitation, kidnapping, extortion, and protection rackets.
Spread of violence	Battlefields where professionalized armies and navies encounter one another. In "total" war, industrial infrastructure and population centers become "legitimate" targets.	Global North intervenes indirectly or uses weapons that minimize risk to own troops. Rhetorical strategies deflect responsibility for violence and aftermath.	No clear spatial demarcation. Pockets of peace in violent regions; pockets of violence in peaceful areas. Armed forces extend zone of conflict; noncombatants relocate to more remote areas in search of safety.
Treadmill of destruction	Highly toxified battlefields; weapons manufacture environmentally destructive. In total war: wide-spread destruction of major cities and	Wars and attendant environmental impacts shifted to Global South. Decisions to degrade environment and to deploy environmentally irresponsible weapons	Rapacious extraction of natural resources to finance military operations; toxification of ecosystem to deprive enemy of resources and sanctuary.

	degradation infrastructure.	of	(e.g., uranium tipped projectiles) and tactics (e.g., aerial dispersion of herbicides).	
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a Source: Mary Kaldor (1999). New and Old Wars.

b Source: Martin Shaw (2005). The New Western Way of War.

In Colombia, patterns of violence diverge markedly from those characteristics of “old” wars. Instead of pitched battles among formally organized and state- controlled military units, violence is widely dispersed, sustained battles have been rare, and the violence has often involved efforts to generate revenues from illegal activities (especially coca and cocaine) and efforts to suppress the drug trade. The financing of this violence is also distinctive relative to “old” wars. The Colombian military forces have been financed through taxation, but the United States has also played a prominent role by providing sizeable military aid and by directly participating in drug eradication and counterinsurgency efforts. Especially in drug-producing areas, income generated from illegal activities often surpasses revenues from legal businesses. In predatory fashion, the diverse fighting forces have fought to control and/or profit from these illegal activities (e.g., extraconstitutional taxation and a variety of protection rackets). The resulting environmental degradation—the treadmill of destruction—reflects the specific forms of warfare. The predation of armed forces leads to unsustainable coca cultivation and cocaine production processes. The widespread conflict (both in number of casualties and in the spatial dimensions) and the disproportionate harm imposed on noncombatants results in dislocation of those caught in the crossfire. This contributes to accelerated deforestation and rapid degradation of lands newly brought under cultivation. The United States, in calculated fashion, amplifies these dynamics. Most notably, the U.S. commitment to crop eradication and other forms of military aid escalates the scale of violence confronting noncombatants and amplifies the environmental degradation.

While our focus will center on environmental degradation, the human suffering is staggering. In the context of widespread, low-tech and disorganized skirmishes, the civilian population is often treated harshly, including rape, dismemberment, kidnapping, and coerced conscription. Between 1990-2012 over 10,000 Colombians were victimized by landmines in 31 of 32 departments, an issue further exacerbated by humanitarian displacement crisis that is second only to the Sudan (Ballve 2013; United Nations Human Rights Council 2013). From 1945-2000, at the global level, roughly 41 million people died due to armed conflict (Leitenberg 2006); a disproportionate number of wars and casualties occurred in the nations of the Global South (Summerfield 1991). More alarming still, noncombatants bear the brunt of this violence. Civilian deaths comprised roughly 5% of all deaths in World War I, but by the end of the 20th Century, civilians suffered roughly 90% of all deaths in war (Summerfield 1991: 159). Thus, it appears that 21st Century warfare will exacerbate a host of social and environmental problems (crime, war on drugs, climate change), and the consequences for the civilian population will be disastrous.

The Treadmill of Destruction in Colombia

The violence and conflict in Colombia has a long history, with much of it characteristic of “new” wars. As Guerrero Baron and Mond (2001: 13) assert, “there is consensus that great social inequality and instability give rise to a dynamic that confers legitimacy on revolutionary projects and violent alternatives.” The weak Colombian state lacked a firm monopoly on the means of violence long before the rise of guerilla armies, paramilitary groups and highly armed drug cartels (Holmes *et al.* 2008). The topography of Colombia and the longstanding history of regional and interdepartmental violence contributed to the Colombian state's weakness in the late 20th Century. Colombia has a poor land transportation and communication infrastructure, lacking both roads and railroads; river transportation continues to be of central importance (Holmes *et al.* 2008). The decentralized state, poor infrastructure, rugged topography, and geographic isolation of independent regional powers set the stage for intensified violence.

Beginning in the 1940's the Colombian people have endured political upheaval and civil war. Following the volatile years labeled as “la Violencia,” rural lands became concentrated in the hands of Colombia's elite (known as the National Front agreement). In the 1960s, revolutionary peasant forces, such as the Revolutionary Armed Forces of Colombia (FARC), rejected the heightened inequality and challenged the state's legitimacy (Brittain 2010). In the context of the Cold War and in the shadow of the Cuban Revolution, the United States actively participated in counterinsurgency efforts. “Operation Marquetalia” (1964) was a joint US/Colombian operation that foreshadowed the weapons and tactics that would be featured in Vietnam, including the use of napalm; the effort cost roughly \$3 billion (in inflation adjusted dollars) and though it was interpreted as a success by the Colombian government, this military action served as a rallying point for peasant forces (Brittain 2010). In subsequent decades (1970s-1980s) FARC increased its presence across the country, and by 1990 it had become a powerful force in and of itself. Wickham-Crowley (1992) emphasizes the expansion of modern capitalist agriculture— especially commercialized coffee production—to explain the growing peasant support for the FARC.

From these revolutionary origins, FARC moved in the direction of a “narco-guerrilla” organization. While the specificity of Colombia's history shaped this transformation, it is also characteristic of the “new” wars of recent decades (see Table 1). FARC and other left-leaning guerrilla forces taxed drug organizations in the regions under their control and used the funds to finance military and political activities (Peceny and Durnan 2006; Saab and Taylor 2009; Holmes *et al.* 2008; Stokes 2001, 2005). Even as FARC became directly involved in coca cultivation and cocaine manufacture, it attempted to preserve its political objectives “by manipulating the conventional coca industry in the hopes of strengthening sociopolitical and economic conditions for the marginalized” (Brittain 2010: 89).

Even though the U.S. war on drugs officially began under the Nixon administration in 1969, it genuinely began when the Posse Comitatus Act of 1878 was amended in 1981 to allow the Department of Defense (DoD) to mobilize the military in domestic legal threats, namely illicit drug trade (Ronderos 2003). With this legal backing, the Reagan Administration deemed the drug trade a national security threat and began employing military personnel and equipment to combat drug trafficking at the point of production (Bagley 1991). The militarization of the war on drugs is reflected in budgeting trends. In 1981, Congress allocated no funding to drug interdiction efforts, but by 1987

Congress allocated upwards of \$379 million to such efforts (Bagley 1991; Mabry 1988). As the war on drugs became synonymous with military intervention, some influential leaders in the Pentagon voiced concerns (Mabry 1988; Zirnite 1997). In 1985 Secretary of Defense, Caspar Weinberger, argued that “reliance on military forces to accomplish civilian tasks is detrimental to both military readiness and the democratic process” (Zirnite 1997: 8). These reservations notwithstanding, a rapid militarization of the war on drugs ensued culminating in “Plan Colombia.”

“Plan Colombia” originated with Colombian President Andres Pastrana in 1998 (Scott 2003). The Clinton and Bush Administrations used the claim that military training and engagement would improve Colombia’s human rights climate to justify U.S. military involvement. Even though the human rights situation has seen little improvement since the initiation of this policy (Vaicius and Isacson 2003), Plan Colombia was supported, and at times expanded, by the George W. Bush administration and the Barack Obama administration. Between 2000-2010, under the auspices of Plan Colombia (and related programs), more than \$7 billion in aid flowed to Colombia (Congressional Research Service 2011); only Israel and Egypt received more military aid over this time period (Buxton 2006).

Pastrana’s original plan included military components, but it placed considerable emphasis on development. Buxton (2006) argues that the U.S. government reworked the effort into a highly militarized “battle plan” and that Pastrana “bypassed or ignored” agencies charged with maintaining checks on presidential power and a number of elected officials had no opportunity to provide input as Plan Colombia was revised and implemented (Buxton 2006). The revised Plan Colombia expanded aerial spraying of defoliants and authorized U.S. support of interdiction efforts by the Colombian National Police. The Plan also included limited support for development programs and social justice reforms (Messina and Delamater 2006). But it must be borne in mind that roughly 80% of Plan Colombia outlays supported military operations. The sharp discrepancy between U.S. spending on coca eradication (\$205 million) and economic development (\$72 million) in Colombia for 2006 (Davalos, Bejarano, and Correa 2009) underscores the military emphasis in the policy. Thus, Plan Colombia was in large measure “a military offensive aimed at debilitating Colombia’s powerful rebel groups and aerielly fumigating the abundant coca and poppy crops” (Mugge 2004: 311).

Plan Colombia was adopted in 2000. In the following decade, the production of cocaine (and import into the United States) increased significantly. Furthermore, FARC and other left-leaning forces remained potent (relying on revenues generated through the drug trade to support military efforts). These failures were compounded by right wing paramilitary groups (promoted and/or condoned by the Colombian government to counter left-leaning insurgents) becoming major players in the drug industry. In short, the Colombian drug economy continued to expand and thrive (Scott 2003), thereby legitimizing FARC as a governing body and accepted taxation system throughout much of the coca producing region. FARC and its supporters would highlight that its involvement in coca cultivation and drug processing was more benign than alternatives (organized criminal organizations and rightwing paramilitary organizations). Regardless of which armed force was in control, the division between public and private and the distinction between military and civilian was obscured; coercion lay at or near the surface of coca cultivation and sale. In terms of treadmill of destruction dynamics, coca cultivation and drug manufacture became an indispensable source of revenue to support

military operations, leading to widespread adoption of environmentally irresponsible practices.

The links between the drug trade and the financing of war insured far-reaching environmental degradation in Colombia. These treadmill dynamics were amplified by U.S. policies, especially those premised on risk-transfer militarism. To obscure its far-reaching interventions and complicity, the United States sought to distance itself from the ugly consequences of Plan Colombia and maintain good standing within the international community by utilizing “surrogacy” (Bonds 2013). Technically speaking, U.S. policy only provides material support to the Colombian military by supplying helicopters, weapons, communications equipment and technology, infrastructure (i.e. building roads), and training (Mugge 2004). The Colombian government has allied itself (openly and covertly) with paramilitary forces. These paramilitary forces, at different times, have been both a legal and extra-legal means of confronting the left-leaning revolutionary force of FARC. The collusion of paramilitary factions with the Colombian military has convinced many analysts that these forces receive some share of the U.S.-sponsored equipment and training (Mugge 2004). It has been estimated that these paramilitary forces account for roughly 3,000 civilian casualties per year in Colombia (Mugge 2004; see also, Dube and Naidu 2010). Although the full range of U.S. involvement is cloaked in secrecy, the available evidence suggests that the United States is playing an active role. Priest (2013) reports that the Colombian military used Raytheon-produced smart bombs (weapons closely controlled by the U.S. Central Intelligence Agency) against FARC leader Raul Reyes inside Ecuadorian territory. This violation of Ecuadoran sovereignty sparked both a military and diplomatic crisis in 2008, leading to the deployment of Venezuelan and Ecuadorian troops on the Colombian frontiers. Ecuador filed lawsuits with the International Criminal Court and the Inter- American Commission on Human Rights against Colombia, claiming human rights violations related to violence and coca eradication efforts (both lawsuits were eventually dropped by Ecuador).

Colombia provides an unusually valuable lens in the tragic face of contemporary warfare. If we use Kaldor’s (1999) definition of war—i.e., organized violence—Colombia has been enduring war for more than 50 years. In recent decades, this warfare has displayed the distinctive pathologies of the “new” wars. Internal to Colombia, powerful criminal organizations, left-leaning insurgent forces and rightwing paramilitary forces have tapped into the lucrative drug trade to finance war efforts (directly and indirectly) and to sustain a highly corrupt and coercive economy. In this context, the state’s monopoly over the means of violence and its legitimacy is eroded. These dynamics are amplified by the direct and cynical involvement of the world’s leading military power (Bejarano and Pizarro 2005; Hough 2011). The increased militarization of the Colombian government not only led to the degradation of Colombian democracy (Bejarano and Pizarro 2005), but it simultaneously motivated FARC and other guerilla armies to adopt more repressive treatment of the local population and, ultimately, to engage in “state like” activities such as war making, state making, extraction, and protection (Hough 2011). Although Plan Colombia was pursued under the apolitical banner of an anti-narcotics effort, it is clear that the United States actively supported the Colombian state’s attempts to rid the country of left-leaning revolutionaries. As Buxton (2006: 186) points out: “Given the power and influence that the USA had over the Colombian government at the time, it is open to question how far the Colombian president would have been able to resist U.S. eradication plans and strategies.” Colombian officials were not merely on the receiving end of arm-twisting. Colombia

benefitted from this relationship and used resources flowing from Plan Colombia to weaken revolutionary challengers. The United States insulated its personnel and its homeland from the ravages of this prolonged war. The human costs were disproportionately borne by noncombatants, the environmental impacts were concentrated in some of Colombia's (and the world's) most ecologically diverse but vulnerable lands and resources.

The Environmental Consequences and Human Risks of the War on Drugs in Colombia

The “new” wars of the 21st Century continue and accelerate a disturbing trend: casualties among noncombatants far surpass those suffered by armed military forces. Casualties are inflicted—including a growing tolerance for casualties among noncombatants—where instrumental calculations point to strategies and tactics that achieve military objectives including a high casualty rate among noncombatants (even if inadvertent). The risk-transfer militarism adopted by leading military powers insures such outcomes. As is the case with other affluent nations of the Global North, the United States’ overarching objective is to eliminate threats to the homeland and minimize casualties suffered by its own troops. Transferring risks and casualties to people (including noncombatants) and places in the Global South is inherent in this approach to warfare. Shaw (2005) points out that “small massacres” are inevitable and predictable in risk-transfer militarism. That is, when relying on high-tech weapons to fight from a distance, it is inevitable that errors in target selection and guidance systems will result in innocent people being hurt and killed. Because the overarching goal is to transfer risks, the United States accepts this trade-off between “small massacres” and remarkably low casualty rates among its soldiers.

The treadmill of destruction sheds light on the manner in which this extends to ecosystems and environmental systems. Just as the United States is willing to accept the loss of human life that occurs in “small massacres,” it is also willing to accept the degradation of the environment to achieve national security objectives. Of course, this is in the context of risk-transfer militarism. By the same token, the predation of the various military forces operating in Colombia is not limited to acceptance of human suffering. Environmental resources and ecosystems are also squandered and sacrificed to support the war effort. This includes irresponsible and unsustainable cultivation techniques; it also includes the deliberate toxification of the environment to punish and constrain adversaries. Cocaine's “dark value” (Clelland 2014) includes both human and environmental casualties on a tragic scale.

Environmental Degradation as a Military Tactic

The links between environmental degradation and the cocaine trade begins with cultivation practices and the processing of coca leaves. As Bunker (2005) reminds us, transportation and energy demands are integral to cultivation decisions and infrastructure. Coca leaves are bulky, requiring 250-500 kilograms of dried leaves to produce one kilogram of cocaine. Coca paste can and is consumed in the region. For cocaine manufacture, it is an intermediate product: 250-500 kilograms of dried leaves yields 2.5 kilograms of coca paste, depending on content of leaves and specifics of processing (Dombey-Moore, Resetar and Childress 1994). Transporting coca leaves, a bulky commodity, in the context of rugged topography and poor infrastructure would be quite

costly. More to the point, coca leaves are also illegal and valuable. Transporting a large quantity of leaves over long distances risks detection by government officials and theft by armed forces operating in the area. For this reason, coca paste is typically fabricated near areas of cultivation, a process that is toxic for humans and damaging to ecosystems. The chemicals used include organic solvents (e.g., kerosene and diesel fuel), sulfuric acid, and potassium carbonate (Inter- American Drug Abuse Control Commission 2005). The fabrication process consumes and contaminates a great deal of water, resulting in pollution of streams in the area (Mejia and Posada 2008). Reflecting the treadmill of destruction dynamics, producers are driven to maximize harvests as soon as possible and anticipate that coca plants will be eradicated within years of initial planning. For these reasons, heavy and unregulated use of herbicides, fertilizers and insecticides is common. The runoff from these agricultural chemicals further degrades water resources and compounds the environmental harm.

Just as the military forces involved in coca cultivation and cocaine manufacture adopt calculated policies that lead to environmental degradation, so too do those attempting to suppress drug production. The War on Drugs in Colombia relies heavily on spraying herbicides. Neither the United States nor Colombia discloses the specific mixture being used, but most experts agree that some version of Monsanto's glyphosate (i.e. "Roundup") is the base herbicide, but it is mixed with a locally manufactured surfactant, Cosmo-Flux 411 (Mugge 2004; Messina and Delamater 2006). The practice of aerial eradication is a joint operation involving the Antinarcotics Directorate of the Colombian National Police (DIRAN) and the National Affairs Section (NAS) housed at the U.S. Embassy in Bogota (Mugge 2004).

The secrecy surrounding the eradication effort makes it impossible to determine the specific form of glyphosate being used. This is unfortunate because impacts vary with the concentration and specific chemical composition in use (Mugge 2004). In addition, the content of the surfactant is also unknown. All that is known about this chemical is that it is produced in Colombia, where fewer environmental regulations are in effect (Mugge 2004). Regardless of the specific chemicals being used, there is clear and compelling evidence that the use of these herbicides, as practiced in Colombia, would violate regulations in place in the United States (Mugge 2004). In Colombia, glyphosate is being delivered via aerial fumigation from a height of 15 meters (49 feet), but the Environmental Protection Agency requires that it be applied at a height of 3-10 meters (10-32 feet) away (Alvarez 2001b; Buxton 2006). Similarly, the recommended dosage of glyphosate is approximately 2.3 liters/hectare (0.60 gallons/hectare). In Colombia, it is being applied at five to ten times the recommended concentration (23.7 liters/hectare or 6.26 gallons/hectare) (Alvarez 2001b; Buxton 2006).

With few exceptions (Solomon 2007, 2009), a large body of research points to negative environmental impacts from these eradication efforts. These negative impacts include adverse effects for amphibians (Meza-Joy, Ramirez-Pinilla, and Fuentes-Lorenzo 2013; Relyea 2005a, 2005b, 2011; Solomon 2007, 2009), rats (de Liz Oliveira Cavalli *et al.* 2013) and mice (Jasper, Locatelli, Pilati, Lcatelli 2012). Numerous on-the-ground reports point to the environmental damage attributable to these herbicides (Messina and Delamater 2006; Mugge 2004). While the evidence of environmental impacts is compelling, claims that the eradication program is having the desired effect of decreasing coca production are disputed. During the first ten years of Plan Colombia, there was little evidence that cocaine production suffered. Over the last several years, sharp reductions are in evidence. The Office of National Drug Policy (2012) reports that that cocaine

production capacity in Colombia has declined 25% between 2010-2011. Likewise, the United Nations reports that the total area under coca cultivation in Colombia fell by one-quarter in 2011 (United Nations Office on Drugs and Crime 2012b). Although the recent evidence seems to indicate some decrease in coca production in Colombia, it is less clear that this is reducing the overall amount of cocaine available on world markets. It appears that coca cultivation and cocaine manufacture is shifting to other Andean nations, resulting in what is commonly referred to as the "balloon effect" (The Economist 2013; Hellin 2001).

The broader environmental consequences of these eradication policies include deforestation, contamination of water and water systems, eradication of non-coca crops and natural vegetation, and a generally negative impact on the biodiversity of the region (Alvarez 2002; Armenteras *et al.* 2006; Davalos *et al.* 2009; Davalos *et al.* 2011; Etter, *et al.* 2006; Fjeldsa *et al.* 2005; Messina and Delameter 2006; Mugge 2004).

Human Risks

Research indicates that glyphosate has negative consequences for human cells (Benachour and Seralini 2009) and human cell lines (Gasnier *et al.* 2009), that it induces insidious diseases in humans (Samsel and Saneff 2013) and promotes breast cancer growth in humans (Thongprakaisang *et al.* 2013). In the effected regions, villagers, farmers, and health care specialists have complained of skin illness, eye irritation, vomiting, diarrhea, and miscarriages (Mugge 2004; Transnational Institute 2001). The United Nations, Office of the High Commissioner for Human Rights (2010) considers these reports to be "credible and trustworthy." Although millions of dollars are budgeted to pursue this militarized war on drugs, no funds have been committed to examine these persistent complaints. As is characteristic of the treadmill of destruction, still another risk is transferred to the Global South: to protect the U.S. population from "unsafe" drugs, the people of Colombia are being subjected to environmental dislocation and heightened health impairment. In previous research, Hooks and Smith (2004, 2012) focused on the environmental legacy of weapons (conventional and nuclear) used in the 20th Century's mass industrial wars and the ensuing Cold War. In the new face of militarism in the 21st Century, the most severe impacts on the environment and human health stem from chemical warfare waged on the people and places thought to be involved with coca cultivation.

Without providing details about specific chemicals, quantities and locations, the U.S. State Department acknowledges reliance on glyphosate; explanations of "defensive categorization" are used to justify its use (Bonds 2013). That is, the United States downplays adverse impacts of controversial (potentially illegitimate) military tactics by disputing and minimizing the harm they cause. Spraying in Colombia has been denounced by a wide range of critics in Colombia, throughout Latin America and around the world (Buxton 2006). The State Department describes Cosmo-Flux 411F as "essentially a soap that enhances the ability of the herbicide to penetrate the waxy cuticle of the leaf surface" (U.S. Department of State 2002). Deflecting criticisms, the Department of State asserts that Cosmo-Flux 411F is only "lightly toxic." The State Department also claims that glyphosate is safe because it is "one of the most widely used agricultural herbicides in the world" (U.S. Department of State 2002). In similar fashion, although failing to meet EPA guidelines in this regard, the State Department emphasizes

the dilution of chemicals used for eradication to downplay reports of harm to human health:

...the irritation and toxicity potential of the individual ingredients are reduced when diluted during mixing (the final product is approximately 75 percent water) and the mixture is dispersed when sprayed ...The symptoms of such exposure are likely to be short-term and reversible (U.S. Department of State 2002).

The U.S. government does acknowledge widespread environmental degradation in coca-growing regions yet emphasizes the irresponsible environmental practices of peasants and military forces involved in coca cultivation and cocaine fabrication. “Over the past 20 years, coca cultivation in the Andean region has resulted in the destruction of at least 5.9 million acres of rainforest—an area larger than the states of Maryland and Massachusetts combined” (United States Department of State 2003). This report offers an extended discussion of the toxic chemicals and herbicides and reduction in biodiversity due to coca production; it goes on to discuss the implications for climate change. But, the Department of State makes no mention of its own emphasis on militarized eradication and how this amplifies the environmental impact of coca cultivation and cocaine manufacture. Relying on the rhetorical strategy of “defensive categorization” (Bonds 2013), the United States obscures its own role in the social and environmental disruption and shifts all responsibility to Colombians.

Environmental and Ecological Damage

Given that Colombia houses the largest number of bird species in the world and the second highest number of plant species in the world, the global implications of these developments are significant. Fjeldsa *et al.* (2005) find that biodiversity has decreased in the Andes (particularly in the Colombian Andes) due to the convergence of drug markets, decades of military conflict, and a paucity of economic alternatives for the rural poor in these regions (see also Alvarez 2002). In addition, crop eradication efforts are impacting water supplies and aquatic ecosystems. Monsanto acknowledges that glyphosate can have far-reaching impacts upon water quality and aquatic life. The assault on biodiversity extends to species that rely on water resources that are being compromised by coca cultivation and militarized eradication efforts (Mugge 2004). To date, neither the United States nor the Colombian government has undertaken a thorough study of the damage. Moreover, because neither government will provide detailed information on the extent and chemical composition of the herbicides deployed, independent researchers have been stymied as well.

The eradication of coca plants has had “the unintended consequence of defoliating not only coca but also contiguous and interspersed native forest and food crop parcels” (Messina and Delamater 2006: 127). Banana, corn, and yucca crops suffer when glyphosate is applied (Mugge 2004). This, in turn, has two consequences. In some cases, farmers return to growing coca to compensate for the loss of legal crops (banana, corn, yucca). Second, many farmers turn to forested lands to begin anew. Thus, the eradication program pushes farmers to increase the land under cultivation and, thereby, accelerates deforestation. As farmers are forced to continually move into forested lands - often remote, frequently part of forest reserves - for the purpose of crop production, whether

that be for coca production or subsistence farming, there is both an increase in the release of carbon dioxide (cutting down the forest) and a subsequent loss of carbon sink (annual crops are a less effective carbon sink than forests).

Deforestation is on the rise and is threatening important aspects of biodiversity value (Armenteras *et al.* 2006; Etter *et al.* 2006). Drug eradication is not the only cause of deforestation. Deforestation has been linked to the presence of pasture and agricultural lands, distance to roads and cities (Armenteras, Rodriguez, and Retana 2013; Eraso, Armenteras-Pascual, Alumbremos 2012), colonization and population (Etter *et al.* 2006), and forestry export flows (Shandra, Leckband, and London 2009). Coca cultivation and eradication efforts intensify pressure on Colombia's forests. Coca cultivation is concentrated in the "coca belt" of southern Colombia (International Crisis Group 2005). This area is comprised of a low altitude humid forest wherein the cultivators of coca destroyed roughly 3.45 million acres of land between 1990 and 2000 (Buxton 2006). According to a report prepared by the Transnational Institute (2001), deforestation is a direct effect of the fumigation efforts sponsored by the U.S. military. Indiscriminate aerial herbicide spraying kills not only coca crops, but also food and alternative crops that are being promoted to reduce farmers' dependence on coca crops (Tenenbaum 2002). As coca crops are destroyed, the rural people migrate deeper into the rainforests or up the mountains to maintain their livelihood. Because "slash and burn" planting techniques provide the main method of farming in Colombia the result is increased rainforest destruction (Transnational Institute 2001; see also Achard *et al.* 2002; Nobre, Sellers, and Shukla 1991). Davalos *et al.* (2009: 382) concur, taking into consideration both the irresponsible practices used to cultivate and process coca and the damage caused by militarized eradication efforts, they conclude that "[c]oca is the single most important driver of deforestation in the country."

Alternative development initiatives meant to curb coca production have similarly exacerbated deforestation. Young (2004) observes that new road construction contributes to the spread of coca cultivation. Transportation improvements facilitate the acquisition of agricultural inputs, the purchase of chemicals for coca refinement, and shipment of coca leaves and coca paste. "Without exception, the current coca-growing areas are past tropical forest colonization projects ... this began in the 1960s and continued into the 1990s despite a near universal failure of these projects" (Young 2004: 365). Foreign assistance offered to drug "source" countries typically includes funding for alternative development initiatives and infrastructural enhancements. Road construction requires the bulldozing of tropical forest areas and typically includes the circumvention of environmental protection mandates. In turn, these new and improved roads facilitate illicit drug production by providing a more reliable and cheaper transportation and access to remote forest regions (Young 2004).¹²¹

¹²¹ Two important topics are beyond the scope of this article. First, while we are focused on Colombia, the impact of this militarized war on drugs extends to other Latin American nations. In the 1990s, the US spent more than \$500 billion attempting to immobilize the drug trade forcing illicit crops to the most ecologically fragile lands in Peru, Bolivia and Colombia: the Andean rainforest (Burke 2003; see also Count the Costs 2011). Second, it is essential to plan for remediation in the wake of this war. While challenging in many respects, removing economic incentives for growing crops (whether legal or illegal) would reduce the rates of deforestation and encourage farmers and citizens to invest in improvements in land already being cultivated (Alvarez 2002; Davalos *et al.* 2009; Davalos *et al.* 2011). For the sake of fairness and to promote

While the social and environmental damage of Plan Colombia was immediate, the effects on coca suppression were mixed and slow to emerge. In the initial years of implementation, this militarized war on drugs may have contributed to expanded coca production in Colombia and other Andean nations. After the adoption of Plan Colombia, the number of coca-growing provinces in Colombia increased from 12 to 23 (United Nations Office of the High Commissioner for Human Rights 2010). Furthermore, roughly 42% of the land under coca cultivation between 2001-2011 is on land that was “formerly covered by forests” (United Nations Office on Drugs and Crime 2012a). The local and global environmental consequences of this are staggering as the local population relocates to more remote lands and releasing CO₂ as forests are sacrificed to coca cultivation.

Conclusion

Colombia faces formidable environmental challenges: deforestation, declining biodiversity, and degraded land and water. Colombia’s challenges extend to the political and social realm to include failed economic policies, chronic poverty and unemployment, and overt and armed challenges to the Colombian government. The militarized war on drugs exacerbates these environmental, social and political crises. During its first ten years, Plan Colombia failed to stem the flow of illicit substances to the United States. Since 2010, it appears that coca cultivation and export of cocaine from Colombia has declined. Whether a final assessment concludes that Plan Colombia succeeded or failed to suppress cocaine exports to the United States, this militarized effort highlights the workings of the treadmill of destruction in the 21st Century: diverse armed forces profit directly and indirectly from predatory relations with noncombatants and unsustainable environmental practices. These trends are amplified by the policies of global powers. The risks of militarism-social, political and environmental—are systematically transferred to and borne by the people, ecosystems and institutions of the Global South.

There are signs that Colombia’s internal wars might recede. The Colombian government has met with FARC to negotiate an end to the war (Brodzinsky 2014). The nation’s presidential election is becoming a referendum on these peace talks—to continue the incumbent’s current negotiations or to embrace a more bellicose and punitive posture toward FARC (see BBC News 2013; International Crisis Group 2012; Maloney 2013). Even if we make optimistic assumptions (that the negotiations with FARC go well and that Colombia’s role in coca and cocaine production recedes), Colombia’s future and that of other Andean nations remains perilous. First, the “new” wars of the 21st Century are notable for their concentration in countries with a prior history of conflict, and this has not always been the case. As late as the 1960s, the majority of civil wars took place in countries with no prior history of civil war. From 2000 to 2010, however, ninety percent (90%) of all civil war onsets have occurred in nations with a prior conflict (Walter 2010). As is the case in Colombia, prolonged civil conflict undermine fragile social institutions, generate profound and long lasting grievances, and undermine the state’s legitimacy. The people and places in greatest need for peace and development—the bottom billion (Collier 2008)—are likely to be in a war zone, recovering from a recent war and/or on the verge of another round of war. Second, suppressing coca cultivation and cocaine exports from Colombia does not guarantee an overall reduction in supply at the global level. Prior

durable social institutions, it will be essential to provide social and legal assistance to indigenous peoples (Young 2004) as they seek to recover from the adverse effects of this drug war.

to 1980, Colombia trailed Peru and Bolivia in drug production (and by a wide margin). In what is referred to as the “balloon effect,” as pressure was placed on drug production in these neighboring countries, Colombia’s output increased many times over. As Colombian production has ebbed, Peru recently overtook Colombia and is now the largest producer and exporter of cocaine (Brodzinsky 2014). Further, using species better suited for lower altitude rainforests, coca cultivation now extends into the Amazon rainforest, including sites in Brazil (Duffy 2008). Even if one makes very optimistic assumptions about Colombia, the prospects that coca cultivation, cocaine manufacture, and militarized eradication efforts will continue to impose horrific suffering on the people and ecosystems in the region remain high.

In one important respect, Colombia is not a representative case of the “new” wars of the 21st Century. Ethnic tensions have not been pronounced; genocidal policies have not been pursued. These tensions and social cleavages are all too common in 21st Century wars (Kaldor 1999; Mann 2005; Wimmer 2013)—and they bring a very specific dynamics and challenges. However, in other respects, the Colombian case can be generalized. Specifically, Colombia’s recent history provides a glimpse into dynamics where: (1) a state demonstrably lacks a monopoly over the means of coercion and has lost legitimacy in the eyes of many citizens, and (2) a wide array of non-state militarized groups establish predatory ties to a lucrative and illegal source of revenues, and (3) a prominent and affluent military power intervenes to amplify these dynamics while insulating its own troops and homeland from the human and environmental costs. In this context, the human suffering and human rights abuses are widespread and severe. With regard to environment damage, the consequences of the treadmill of destruction are alarming. Irresponsible production processes have been coupled with ecocidal eradication efforts to cause extensive damage to Colombia’s water, soil and forests and has compromised entire ecosystems. In this way, Colombia exhibits several features of “catastrophic convergence” (Parenti 2011) and “linked crises” (Chase-Dunn 2013). Colombia faces years, perhaps decades, of environmental damage tied the cascade of multiple crises unfolding at once in a location where “new” war, illustrative of risk-transfer militarism, is commonplace. While this examination of Colombia’s recent history offers preliminary insights, it will be important for researchers to continue studying war and its aftermath. And when doing so, it will be important to elucidate the distinctive drivers and dimensions of the treadmill of destruction.

References

- Achard, Federic, Hugh D. Eva, Hans-Jurgen Stibig, Philippe Mayaux, Javier Gallego, Timothy Richards and Jean-Paul Malingeau. 2002. “Determination of Deforestation Rates of the World’s Humid Tropical Forests.” *Science* 297(5583): 999-1002.
- Alvarez, Maria D. 2001b. “Could Peace Be Worse than War for Colombia’s Forests?” *The Environmentalist* 21: 305-315.
- Alvarez, Maria D. 2002. “Illicit Crops and Bird Conservation Priorities in Colombia.” *Conservation Biology* 16(4): 1086-1096.
- Armenteras, Dolores, Guillermo Rudas, Nelly Rodriguez, Sonia Sua, Milton Romero. 2006. “Patterns and Causes of Deforestation in the Colombian Amazon.” *Ecological Indicators* 6: 353-368.

- Armenteras, Dolores, Nelly Rodriguez, and Javier Retana. 2013. "Landscape Dynamics in Northwestern Amazonia: An Assessment of Pastures, Fire and Illicit Crops as Drivers of Tropical Deforestation." *PLoS ONE* 8(1): e54310.
- Ballve, Teo. 2013. "Grassroots Masquerades: Development, paramilitaries, and land laundering in Colombia." *Geoforum* 50: 62-75.
- Bagley, Bruce Michael. 1991. "Myths of Militarization: The Role of the Military in the War on Drugs in the Americas." Pp. 1-37 in *Drug Trafficking in the Americas Series*. Miami: North-South Center, University of Miami.
- BBC News. 2013. "Colombia Peace Talks Resume in Cuba." London: BBC News. Retrieved online July 11, 2013 (<http://www.bbc.co.uk/news/world-latin-america-22853611>).
- Benachour, Nora and Gilles-Eric Seralini. 2009. "Glyphosate Formulations Induce Apoptosis and Necrosis in Human Umbilical, Embryonic, and Placental Cells." *Chemical Research in Toxicology* 22: 97-105.
- Bejarano, Ana Maria and Eduardo Pizarro. 2005. "From to 'Besieged': The Changing Nature of the Limits to Democracy in Colombia"" Pp. 235-260 in *The Third Wave of Democratization in Latin America: Advances and Setbacks*, edited by F. Hagopian and Scott P. Mainwaring. Cambridge: Cambridge University Press.
- Bonds, Eric. 2013. "Hegemony and Humanitarianism Norms: The US Legitimization of Toxic Violence." *Journal of World-Systems Research* 19(1): 82-106.
- Brodzinsky, Sibylla. 2014. "FARC Peace Talks May Tip Balance in Tight Colombian Presidential Race." *The Guardian* (May 22, 2014).
- Brittain, James. 2010. *Revolutionary Social Change in Colombia: The Origin and Direction of the FARC-EP*. New York: Pluto Press.
- Bunker, Stephen. 2005. "How Ecologically Uneven Developments Put the Spin on the Treadmill of Production." *Organization Environment* 18: 38-54.
- Burke, Tom. 2003. "Warning: Drugs Cost the Earth." *New Statesman* 132: 31.
- Buxton, Julia. 2006. *The Political Economy of Narcotics: Production, Consumption and Global Markets*. London/New York: Zed Books.
- Chase-Dunn, Christopher. 2013. "Five Linked Crises in the Contemporary World-System." *Journal of World-System Research* 19(2): 175-181.
- Ciccantell, Paul and David A. Smith. 2009. "Rethinking Global Commodity Chains: Integrating Extraction, Transport, and Manufacturing." *International Journal of Comparative Sociology* 50: 361-384.
- Clark, Brett and Andrew K. Jorgenson. 2012. "The Treadmill of Destruction and the Environmental Impacts of Militaries." *Sociology Compass* 617:557-569.
- Clelland, Donald. 2014. "The Core of the Apple: Dark Value and Degrees of Monopoly in Global Commodity Chains." *Journal of World System Research* 20:82-111.
- Collier, Paul. 2008. *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It*. New York: Oxford University Press.
- Congressional Research Service. 2011. "Latin America and the Caribbean: Illicit Drug Trafficking and U.S. Counterdrug Programs." Retrieved July 11, 2013

(<http://publicintelligence.net/latin-america-and-the-caribbean-illicit-drug-trafficking-and-u-s-counterdrug-programs/>).

- Count the Costs. 2011. "The War on Drugs: Causing Deforestation and Pollution." *Count the Costs Environment Briefing*. Retrieved January 4, 2012 (<https://web.archive.org/web/20170225135327/http://countthecosts.org/seven-costs/deforestation-and-pollution>).
- Davalos, Liliana M., Adriana C. Bejarano, and H. Leonardo Corea. 2009. "Disabusing Cocaine: Pervasive Myths and Enduring Realities of a Globalized Commodity." *International Journal of Drug Policy* 20: 381-386.
- Davalos, Liliana M., Adriana Bejarano, Mark A. Hall, H. Leonardo Correa, Angelique Corthals, and Oscar J. Espejo. 2011. "Forests and Drugs: Coca-Driven Deforestation in Tropical Hotspots." *Environmental Science and Technology* 45: 1219-1227.
- De Liz Oliveira Cavalli, Vera, Daiane Cattani, Carla Elise Heinz Rieg, Paula Pierozan, Leila Zanatta, Eduardo Benedetti Parisotto, Danilo Wilhelm Filho, Fatima Regina Mena Barreto Silva, Regina Pessoa-Pureur, and Ariane Zamoner. 2013. "Roundup Disrupts Male Reproductive Function by Triggering Calcium-Mediated Cell Death in Rat Testis and Sertoli Cells." *Free Radical Biology and Medicine* 65: 335-346.
- Dombey-Moore, Bonnie, Susan Resetar, and Michael Childress. 1994. *A System Description of the Cocaine Trade*. Santa Monin, CA; Rand Corporation.
- Dube, Oeindrila and Suresh Naidu. 2010. "Bases, Bullets, and Ballots: The Effect of U.S. Military Aid on Political Conflict in Colombia." Center for Global Development. Working Paper 197, January 2010. Retrieved May 24, 2012 (<http://www.cgdev.org/files/1423498fileDubeNaiduMilitaryAidFINAL.pdf>).
- Duffy, Gary. 2008. "First Coca Find in Brazil Amazon." *BBC News*. Retrieved May 25, 2014 (<http://news.bbc.co.uk/2/hi/7299964.stm>).
- The Economist. 2013. "Why is Less Cocaine Coming from Colombia?" *The Economist*. Retrieved March 5, 2014 (<http://www.economist.com/blogs/economist-explains/2013/04/economist-explains-why-colombia-produces-less-cocaine>).
- Etter, Andres, Clive McAlpine, Kerrie Wilson, Stuart Phinn, Hugh Possingham. 2006. "Regional Patterns of Agricultural Land Use and Deforestation in Colombia." *Agriculture, Ecosystems and Environment* 114: 369-386.
- Eraso, Nelly Rodriguez, Dolores Armenteras-Pascual, and Javier Retana Alumbroeros. 2012. "Land Use and Land Cover Change in Colombian Andes: Dynamics and Future Scenarios." *Journal of Land Use Science* DOI: 10.1080: 1-21.
- Fjeldsa, Jon, Maria D. Alvarez, Juan Mario Lazcano, and Blanca Leon. 2005. "Illicit Crops and Armed Conflict as Constraints on Biodiversity Conservation in the Andes Region." *Ambio* 34(3): 205-211.
- Gasnier, Eline, Coraline Dumont, Nora Benachour, Emilie Clair, Marie-Christine Chagnon, and Gilles-Eric Seralini. 2009. "Glyphosate-base Herbicides are Toxic and Endocrine Disruptors in Human Cell Lines." *Toxicology* 262: 184-191.
- Gould, Kenneth A., David N. Pellow, and Allan Schnaiberg. 2008. *The Treadmill of Production: Injustices and Unsustainability in the Global Economy*. Boulder, Colorado: Paradigm Publishers.

- Guerrero Baron, Javier, and David Mond. 2001. "Is the War Ending? Premises and Hypotheses with Which to View the Conflict in Colombia." *Latin American Perspectives* 28(1): 12-30.
- Hellin, Jon. 2001. "Coca Eradication in the Andes: Lessons from Bolivia." *Capitalism Nature Socialism* 12(2): 139-57.
- Holmes, Jennifer S., Gutierrez De Pineros, Sheila Amin, and Kevin M. Curtain. *Guns, Drugs, and Development in Colombia*. Austin, Texas: University of Texas Press.
- Hooks, Gregory, and Chad L. Smith. 2004. "The Treadmill of Destruction: National Sacrifice Areas and Native Americans." *American Sociological Review* 69:558-76.
- . 2005. "Treadmills of Production and Destruction: Threats to the Environment Posed by Militarism." *Organizations and Environment* 18:19-37.
- . 2012. "The Treadmill of Destruction Goes Global: Anticipating the Environmental Impact of Militarism in the 21st Century." Pp. 60-83 in *The Marketing of War in the Age of Neo-Militarism*, edited by Kostas Gouliamos and Christos Kassimeris. Routledge Press.
- Hopkins, Terence and Wallerstein, Immanuel 1982. *World-Systems Analysis: Theory and Methodology*. Beverly Hills, CA: Sage.
- Hough, Phillip. 2011. "Guerrilla Insurgency as Organized Crime: Explaining the So-Called 'Political Involution' of the Revolutionary Armed Forces of Colombia." *Politics & Society* 39: 379-414.
- Inter-American Drug Abuse Control Commission (CICAD , OAS). 2005. *The Toxicology of Selected Chemicals Used in the Production and Refining of Cocaine and Heroin: A Tier-two Assessment (D 2005-01)*. Washington, DC: Inter-American Drug Abuse Control Commission (CICAD), Organization of American States.
- International Crisis Group. 2005. *War and Drugs in Colombia* (Latin America Report N°11). Brussels: International Crisis Group. Retrieved July 11, 2013 (<http://www.crisisgroup.org/en/regions/latin-america-caribbean/andes/colombia/011-war-and-drugs-in-colombia.aspx>).
- International Crisis Group. 2012. "Colombia: Peace at Last?" Executive Summary and Recommendations. Brussels: International Crisis Group. Retrieved July 11, 2013 (<http://www.crisisgroup.org/en/regions/latin-america-caribbean/andes/colombia/045-colombia-peace-at-last.aspx>).
- Jasper, Raquel, Gabriel Olivo Locatelli, Celso Pilati, and Claudriana Locatelli. 2012. "Evaluation of Biochemical, Hematological and Oxidative Parameters in Mice Exposed to the Herbicide Glyphosate-Roundup®." *Interdisciplinary Toxicology* 5(3): 133-140.
- Jorgenson, Andrew. 2005. "Unpacking International Power and the Ecological Footprints of Nations: A Quantitative Cross-National Study." *Sociological Perspectives* 48:383-402.
- Jorgenson, Andrew and Brett Clark. 2009. "The Economy, Military , and Ecologically Unequal Relationships in Comparative Perspective: A Panel Study of the Ecological Footprints of Nations, 1975-2000." *Social Problems* 56:621-646.
- Jorgenson, Andrew, Brett Clark, and Jeffrey Kentor. 2010. "Militarization and the Environment: A Panel Study of Carbon Dioxide Emissions and the Ecological Footprints of Nations, 1970-2000." *Global Environmental Politics* 10:7-29.

- Kaldor, Mary. 1999. *New and Old Wars: Organized Violence in a Global Era*. Stanford, CA: Stanford University Press.
- Leitenberg, Milton. 2006. "Deaths and Wars in Conflicts in the 20th Century." Ithaca, NY: Cornell University, Peace Studies Program. Retrieved May 22, 2012 (<http://www.clingendael.nl/publications/2006/20060800cdspoccleitenberg.pdf>).
- Lengefeld, Michael and Chad L. Smith. 2013. "Nuclear Shadows: Weighing the Environmental Effects of Militarism, Capitalism, and Modernization in a Global Context, 2001-2007." *Human Ecology Review* 20(1): 11-25.
- Mabry, Donald. 1988. "The US Military and the War on Drugs in Latin America." *Journal of Interamerican Studies and World Affairs* 30(2/3): 53-76.
- Maloney, Anastasia. 2013. "Ten Things You Didn't Know about Colombia's Peace Talks." Thomas Reuters Foundation. Retrieved July 11, 2013 (<http://www.trust.org/item/20130705105455-b396j>).
- Mann, Michael. 2005. *The Dark Side of Democracy: Explaining Ethnic Cleansing*. New York: Cambridge University Press.
- Mejia, Daniel, and Carlos Posada. 2008. *Cocaine Production and Trafficking: What Do We Know?* (Policy Research Working Paper 4618). Washington, DC: World Bank.
- Messina, J. P. and P.L. Delamater. 2006. "Defoliation and the War on Drugs in Putumayo, Colombia." *International Journal of Remote Sensing* 27(1): 121-128.
- Meza-Joya, Fabio Leonardo, Martha Patricia Ramirez-Pinilla, and Jorge Luis Fuentes-Lorenzo. 2013. "Toxic, Cytotoxic, and Genetoxic Effects of a Glyphosate Formulation (Roundup®SL-Cosmoflux®411F) in the Direct-Developing Frog *Eleutherodactylus johnstonei*." *Environmental and Molecular Mutagenesis* 54: 362-373.
- Mugge, Zachary. 2004. "Plan Colombia: The Environmental Effects and Social Costs of the United States' Failing War on Drugs." *Colorado Journal of International Environmental Law and Policy* 15(2): 309-340.
- Nobre, Carlos, Piers J. Sellers, Jagadish Shukla. 1991. "Amazonian Deforestation and Regional Climate Change" *Journal of Climate* 4: 956-988.
- Office of National Drug Control Policy. 2012. "Survey Shows Significant Drop in Cocaine Production in Colombia." Retrieved August 1, 2012 (<http://www.whitehouse.gov/ondcp/news-releases-remarks/survey-shows-significant-drop-in-cocaine-production-in-colombia>).
- Peceny, Mark and Michael Duman. 2006. "The FARC's Best Friend: U.S. Antidrug Policies and the Deepening of Colombia's Civil War in the 1990s." *Latin American Politics and Society* 48(2): 95-116.
- Parenti, Christian. 2011. *Tropic of Chaos: Climate Change and the New Geography of Violence*. New York: Nation Books.
- Priest, Dana. 2013. "Covert Action in Colombia." *Washington Post*. 21 Dec., 2013 (<http://www.washingtonpost.com/sf/investigative/2013/12/21/covert-action-in-colombia/>).
- Relyea, Rick A. 2005a. "The Impact of Insecticides and Herbicides on the Biodiversity and Productivity of Aquatic Communities." *Ecological Applications* 15(2): 618-627.

- Relyea, Rick A. 2005b. "The Lethal Impact of Roundup on Aquatic and Terrestrial Amphibians." *Ecological Applications* 15(4): 1118-1124.
- Relyea, Rick A. 2011. "Amphibians Are Not Ready for Roundup®." Pp. 267-300 in *Wildlife Ecotoxicology: Forensic Approaches*, edited by J.E. Elliot, C.A. Bishop, and C. Morrissey. New York: Springer.
- Ribot, Jesse. 1998. "Theorizing Access: Forest Profits along Senegal's Charcoal Commodity Chain." *Development and Change* 29: 307-41.
- Rice, James. 2007. "Ecological Unequal Exchange: Consumption, Equity, and Unsustainable Structural Relationships within the Global Economy." *International Journal of Comparative Sociology* 48: 43-72.
- Ronderos, Juan G. 2003. "The War on Drugs and the Military: The Case of Colombia." Pp. 207-236 in *Critical Reflections on Transnational Organized Crime, Money Laundering, and Corruption*, edited by Margaret E. Beare. Toronto: University of Toronto Press.
- Saab, Bilal Y. and Alexandra W. Taylor. 2009. "Criminality and Armed Groups: A Comparative Study of FARC and Paramilitary Groups in Colombia." *Studies in Conflict & Terrorism* 32: 455-475.
- Samsel, Anthony and Stephanie Seneff. 2013. "Glyphosate's Suppression of Cytochrome P450 Enzymes and Amino Acid Biosynthesis by the Gut Microbiome: Pathways to Modern Diseases." *Entropy* 15: 1416-1463.
- Schnaiberg, Allan. 1980. *The Environment: From Surplus to Scarcity*. New York: Oxford University Press.
- Schnaiberg, Allan and Kenneth A. Gould. 1994. *Environment and Society: The Enduring Conflict*. New York: St. Martin's Press.
- Scott, Peter Dale. 2003. *Drugs, Oil and War: The United States in Afghanistan, Colombia, and Indochina*. Lanham, Maryland: Rowman and Littlefield.
- Shandra, John M., Christopher Leckband and Bruce London. 2009. "Ecologically Unequal Exchange and Deforestation: A Cross-National Analysis of Forestry Export Flows." *Organization & Environment* 22(3): 293-310.
- Shaw, Martin. 2002. "Risk-Transfer Militarism: Small Massacres and the Historic Legitimacy of War." *International Relations* 16:343-60.
- . 2005. *The New Western Way of War: Risk-Transfer War and Its Crisis in Iraq*. Cambridge, UK: Polity.
- Solomon, Keith, Arturo Anadon, Gabriel Carrasquilla, Antonio L. Cerdeira, Jon Marchall, and Luz-Helena Sanin. 2007. "Coca and Poppy Eradication in Colombia: Environmental and Human Health Assessment of Aerially Applied Glyphosate." *Reviews of Environmental Contamination and Toxicology* 190: 43-125.
- Solomon, Keith, E.J.P. Marshall, and Gabriel Carrasquilla. 2009. "Human Health and Environmental Risks from the Use of Glyphosate Formulations to Control the Production of Coca in Colombia: Overview and Conclusions." *Journal of Toxicology and Environmental Health, Part A* 72: 914-920.
- Stokes, Doug. 2001. "Better Lead than Bread? A Critical Analysis of the US's Plan Colombia." *Civil Wars* 4(2): 59-78.

- Stokes, Doug. 2005. *America's Other War: Terrorizing Colombia*. New York: Zed Books.
- Summerfield, Derek. 1991. "The Psychosocial Effects of Conflict in the Third World." *Development in Practice*. 1(3): 159-173.
- Tenenbaum, David. 2002. "Coca-Killing Controversy." *Environmental Health Perspectives* 110(5): A236.
- Thongprakaisang, Siripom, Apinya Thiantanawat, Nuchanart Rangkadilok, Tawit Suriyo, and Jutamaad Satayavivad. 2013. "Glyphosate Induces Human Breast Cancer Cells Growth Via Estrogen Receptors." *Food and Chemical Toxicology* 59: 129-136.
- Tilly, Charles. 1975. "Reflections on the History of European State-Making." Pp. 3-83 in *The Formation of National States in Western Europe*, edited by Charles Tilly. Princeton: Princeton University Press.
- Transnational Institute. 2001. "Vicious Circle: The Chemical and Biological 'War on Drugs.'" *Transnational Institute Report*. Retrieved March 2, 2012 (<http://www.tni.org/sites/www.tni.org/files/download/viciouscircle-e.pdf>).
- United Nations, Office of the High Commissioner for Human Rights. 2010. "Briefing 6: Human Rights and Drug Policy: Crop Eradication." New York: United Nations Retrieved May 25, 2012 (<http://www2.ohchr.org/english/bodies/cescr/docs/ngos/IHRAColombia44.pdf>).
- United Nations, Office on Drugs and Crime. 2010. *World Drug Report 2010*. New York: United Nations. Retrieved March 5, 2014 (<http://www.unodc.org/documents/wdr/WDR2010/WorldDrugReport2010lo-res.pdf>).
- . 2012a. "Colombia Coca Cultivation Survey 2011." New York: United Nations. Retrieved August 1, 2012 (<http://www.unodc.org/documents/crop-monitoring/Colombia/ColombiaCocaCultivationSurvey2011.pdf>).
- . 2012b. "Colombia Grows Quarter Less Coca Crop, According to UNODC 2012 Survey." New York: United Nations. Retrieved March 5, 2014 (<http://www.unodc.org/unodc/en/frontpage/2013/August/colombia-grows-quarter-less-coca-crop-according-to-unodc-2012-survey.html>).
- United Nations, Human Rights Council. 2013. "Universal Periodic Review: National report submitted in accordance with paragraph 5 of the annex to Human Rights Council resolution 16/21." New York: United Nations. Retrieved Jan. 13, 2013 (<http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/TFIA-HRC-RES-16-21en.doc>).
- United States Department of State. 2002. "Chemicals Used for the Aerial Eradication of Illicit Coca in Colombia and Conditions of Application." Retrieved August 8, 2013 (<http://www.state.gov/j/inl/rls/rpt/aeicc/13234.htm>).
- United States Department of State. 2003. "Environmental Consequences of the Illicit Coca Trade." Retrieved May 25, 2012 (<http://2001-2009.state.gov/p/inl/rls/fs/3807.htm>).
- Vaicius, Ingrid and Adam Isacson. 2003. "The 'War on Drugs' meets the 'War on Terror:' The United States' Military Involvement in Colombia Climbs to the Next Level." International Policy Report. Retrieved May 29, 2012. (<http://www.ciponline.org/images/uploads/publications/0302ipr.pdf>).
- Walter, Barbara. 2010. Conflict Relapse and the Sustainability of Post-Conflict Peace (World Development Report 2011: Background Paper). Washington, D.C.: World Bank. Retrieved

- Wickham-Crowley, Timothy P. 1992. *Guerrillas & Revolution in Latin America: A Comparative Study of Insurgents and Regimes Since 1956*. Princeton, New Jersey: Princeton University Press.
- Wimmer, Andreas. 2013. *Waves of War: Nationalism, State Formation, and Ethnic Exclusion in the Modern World*. New York: Cambridge University Press.
- York, Richard. 2008. "De-carbonization in Former Soviet Republics, 1992-2000: The Ecological Consequences of De-modernization." *Social Problems* 55:370-390.
- Young, Kenneth R. 2004 "A Geographical Perspective on Coca/Cocaine Impacts in South America." Pp. 363-367 in *WorldMinds: Geographical Perspectives on 100 Problems*, edited by Donald G. Janelle, Barney Warf, and Kathy Hansen. The Netherlands; Kluwer Academic Publishers. Retrieved April 22, 2012 (<http://books.google.com/books?hl=en&lr=&id=OVxzNOj7feEC&oi=fnd&pg=PA363&dg=Threats+to+Biological+Diversity+Caused+by+Coca/Cocaine+Deforestation+in+Peru&ots=WC02beKXH&sig=Owlg-w0R41lwr-2HpE1KzB5Eg#v=onepage&q=Threats%20to%20Biological%20Diversity%20Caused%20by%20Coca%2FCocaine%20Deforestation%20in%20Peru&f=false>).
- Zirnite, Peter. 1997. "Reluctant Recruits: The US Military and the War on Drugs." Washington Office on Latin America (WOLA), Transnational Institute Report. Retrieved March 25, 2012 (<http://www.tni.org/sites/www.tni.org/files/download/Reluctant%20recruits%20reportO.pdf>).

Previously published: Smith, Chad L., Gregory Hooks, and Michael Lengefeld. "The war on drugs in Colombia: The environment, the treadmill of destruction and risk-transfer militarism." *Journal of World-Systems Research* (2014): 185-206.

4 Routine Violence: Alcohol, Coffee, Cigarettes, and Ecology

Toxicity of Cigarette Butts, and their Chemical Components, to Marine and Freshwater Fish

by Elli Slaughter, Richard M Gersberg, Kayo Watanabe, John Rudolph, Chris Stransky, and Thomas E. Novotny

Abstract

Background: Cigarette butts are the most common form of litter, as an estimated 4.5 trillion cigarette butts are thrown away every year worldwide. Many chemical products are used during the course of growing tobacco and manufacturing cigarettes, the residues of which may be found in cigarettes prepared for consumption. Additionally, over 4000 chemicals may also be introduced to the environment via cigarette particulate matter (tar) and mainstream smoke.

Methods: Using US Environmental Protection Agency standard acute fish bioassays, cigarette butt-derived leachate was analysed for aquatic toxicity. Survival was the single endpoint and data were analysed using Comprehensive Environmental Toxicity Information System to identify the LC50 of cigarette butt leachate to fish.

Results: The LC50 for leachate from smoked cigarette butts (smoked filter + tobacco) was approximately one cigarette butt/l for both the marine topsmelt (*Atherinops affinis*) and the freshwater fathead minnow (*Pimephales promelas*). Leachate from smoked cigarette filters (no tobacco), was less toxic, with LC50 values of 1.8 and 4.3 cigarette butts/l, respectively for both fish species. Unsmoked cigarette filters (no tobacco) were also found to be toxic, with LC50 values of 5.1 and 13.5 cigarette butts/l, respectively, for both fish species.

Conclusion: Toxicity of cigarette butt leachate was found to increase from unsmoked cigarette filters (no tobacco) to smoked cigarette filters (no tobacco) to smoked cigarette butts (smoked filter + tobacco). This study represents the first in the literature to investigate and affirm the toxicity of cigarette butts to fish, and will assist in assessing the potential ecological risks of cigarette butts to the aquatic environment.

Background

Cigarette butts are the most common form of litter in the world, as approximately 5.6 trillion cigarettes are smoked every year worldwide.¹ Cigarette waste constitutes an estimated 30% of the total litter (by count) on US shorelines, waterways and on land

(LitterFreePlanet, 2009). In fact, cigarette butts are the most common debris item collected along waterways during the Ocean Conservancy's yearly International Coastal Cleanup. In all, 2 189 252 cigarettes were collected during the 2009 cleanup. (Ocean Conservancy, 2010) Conservatively, this quantity of cigarettes weighs approximately 821 lb and displaces a volume of 1095 litres.² Owing to the ubiquitous nature and magnitude of cigarette butts discharged into the environment, studies are needed to determine whether cigarette butt waste can exert ecotoxic effects when in aquatic environments.

Many chemical products are used during the course of growing tobacco and manufacturing cigarettes, the residues of which may be found in cigarettes prepared for consumption.^{3 4} These include pesticides, herbicides, insecticides, fungicides and rodenticides.⁵ Additionally, over 4000 chemicals may also be introduced to the environment via cigarette particulate matter (tar) and mainstream smoke.⁴ These include chemicals such as carbon monoxide, hydrogen cyanide, nitrogen oxides, polycyclic aromatic hydrocarbons, ammonia, acetaldehyde, formaldehyde, benzene, phenol, argon, pyridines and acetone, over 50 of which are known to be carcinogenic to humans.⁴ A study performed by Moriwaki *et al* found that arsenic, nicotine, polycyclic aromatic hydrocarbons and heavy metals are released into the environment by littered 'roadside waste' cigarette butts.⁶ Moreover, previous studies have shown chemicals in cigarette butt leachate can be acutely toxic to aquatic organisms.^{2 7 8} Register found leachates from smoked cigarette tobacco, smoked cigarette filters and unsmoked cigarette filters to be acutely toxic to the freshwater cladoceran *Daphnia magna* between 0.125 and 0.25, 1 and 2, and >16 cigarette butts/l (48-hour LC50 (lethal concentration the concentration that kills 50% of a sample population)), respectively.² Warne *et al* found leachates from smoked cigarette butts, smoked cigarette filters, and unsmoked cigarette filters to be acutely toxic to the freshwater cladoceran *Ceriodaphnia cf dubia* at 0.06, 0.16, and 1.7 cigarette butts/l, respectively (48-hour EC50 (immobilisation)), and to the marine bacterium *Vibrio fischeri* at 0.58, 1.25, and >970 cigarette butts/l, respectively (30-minute EC50 (bioluminescence)).⁷ The EC50 is the concentration at which 50% of the test organisms exhibit a specified effect (eg, immobilisation). Lastly, Micevska *et al* found that leachate from various brands of smoked cigarette butts were toxic to *Ceriodaphnia cf dubia* at concentrations between 8.9 and 25.9 mg butts/l (which corresponds to 0.03e 0.08 butts/l) (48-hour EC50 (immobilisation)) and to *Vibrio fischeri* at concentrations between 104 and 832 mg butts/l (which corresponds to 0.3e 2.7 butts/l) (30-minute EC50 (bioluminescence)).⁸ This research also found that toxicity for both test species was related to cigarette brand as well as tar content. There is no research to support that flavoured cigarettes (eg, menthol) alter toxicity or impart additional toxicity.

All previous studies used non-vertebrate species (ie, daphnids and marine bacteria) for testing the toxicity of cigarette butts in water, while similar studies investigating the toxicity to vertebrates, specifically marine and freshwater fish, have not been performed. Fish are ecologically important organisms, and are often used as bioindicators of healthy aquatic systems. Furthermore, toxicity data for a number of aquatic species are the minimum needed to derive water quality guidelines or to conduct hazard assessments. Therefore, it is important to determine the toxicity of cigarette butt leachate to fish. In this study, we investigated the toxicity of smoked cigarette butts (smoked filter + tobacco), smoked cigarette filters (no tobacco), as well as unsmoked cigarette filters (no tobacco) to the marine fish, topsmelt (*Atherinops affinis*), and to the freshwater fathead minnow (*Pimephales promelas*) in order to better understand the impact of cigarette waste on both marine and freshwater ecosystems. The specific aims of this study were to:

1. Determine if smoked cigarette butts (SCB) (smoked filter + tobacco), smoked filters (SF) (no tobacco) and unsmoked filters (USF) (no tobacco) were acutely toxic to a representative marine and freshwater fish.
2. Determine whether most of the toxicity of a cigarette butt was in the filter or the remnant tobacco.
3. Compare the sensitivity of fish to cigarette butts with other aquatic test organisms.
4. Determine if smoking increases the toxicity of cigarette filters.

Materials and Methods

Toxicity test methods followed US Environmental Protection Agency (EPA) acute protocols.⁹ Tests on both topsmelt and fathead minnows were performed utilising three different cigarette leachates: (1) leachate from smoked cigarette butts (SCB), with 1e2 cm of remnant tobacco left intact with the filter. This test was performed twice, once with artificially smoked cigarettes and again with naturally smoked cigarettes; (2) leachate from smoked cigarette filters (SF), with all remnant tobacco removed. This test was performed three times, once with artificially smoked cigarettes and twice with naturally smoked cigarettes; (3) leachate from unsmoked cigarette filters (USF), without tobacco. This test was performed once.

Test cigarettes consisted of regular filtered cigarettes (ie, no flavoured or light cigarettes were used). Cigarettes were purchased new and artificially smoked at the University of California, San Francisco, in order to control for variability and to decrease the risk of contamination from external sources. Cigarettes were smoked according to ISO Standard 3308:2000 using a TE10z smoking machine (Teague Enterprises, 530-406-88931237 E Beamer, Suite E Woodland, CA 95776, USA). Cigarettes that self-extinguished prior to completion of a complete smoking cycle were relit with a disposable butane lighter. For comparative purposes, toxicity tests were also carried out using naturally smoked cigarettes, defined as cigarettes that were actually smoked by people, extinguished in cigarette disposal units and collected within 24 hours of deposition.

To produce the leachate stock, cigarette butts were submerged and allowed to soak in dilution water (diluted mineral water for freshwater tests and natural seawater for saltwater tests), prepared according to EPA protocol, for 24hours.⁹ Diluted mineral water consisted of eight parts nanopure deionised water for every two parts Perrier mineral water. Following overnight aeration, the diluted mineral water would yield a pH range of 7.9e8.3 and a hardness range of 80e100 mg/l CaCO₃. Natural seawater was obtained from Scripps Institution of Oceanography and transported to the laboratory. Seawater was held in a flow-through system with a 20 mm in-line fibre filter and chiller unit. The leachate stock for the smoked cigarette butt (SCB) (smoked filter + tobacco) test was made by adding eight cigarette butts to 2 litres of dilution water. A 0.53 dilution series was then performed to obtain subsequent lower concentrations. Concentrations for this test were 4, 2, 1, 0.5, 0.25, 0.125 cigarette butts/l. The leachate stock for the smoked cigarette filter (SF) (no tobacco) test was made by adding 16 filters to 2 litres of dilution water. Concentrations for this test were 8, 4, 2, 1, 0.5, 0.25, 0.125cigarette butts/l. The leachate stock for the unsmoked cigarette filter (USF) (no tobacco) test was made by adding 32 filters to 2 litres of dilution water. Concentrations for this test were 16, 8, 4, 2,

1, 0.5 cigarette butts/l. All tests were run with laboratory controls comprised of clean dilution water of either natural seawater for the saltwater tests or diluted mineral water for the freshwater tests.

There were four replicates for every concentration, each replicate containing five fish, for a total of 20 fish per concentration. Topsmelt were 7e14 days old and fathead minnows were 12e14 days old. Both were fed *Artemia* (brine shrimp) prior to initiation and again after 48 hours of testing. Fish were provided by Aquatic Bio Systems in Fort Collins, Colorado. All tests received continuous light aeration, a water renewal at 48 hours, and a light cycle of 16 hours of light and 8 hours of darkness. Water quality readings (pH, conductivity, salinity, dissolved oxygen and temperature) and survival counts were performed on a daily basis until test termination at 96 hours, to ensure a controlled environment. Water was to have a dissolved oxygen content between 6 mg/l and 9 mg/l at initiation and at the 48-hour renewal, and was never allowed to fall below 4 mg/l during testing. Temperature was to remain between 20-18°C for saltwater tests and 25-18°C for freshwater tests. Water quality parameters were measured by various meters: the Orion 250A+ pH meter, the YSI 550A dissolve oxygen meter and the Orion 130 to measure temperature, conductivity and salinity. Mean survival in the laboratory controls must be 90% or greater in order for the test to be deemed acceptable.⁹

Survival was the endpoint evaluated and data were analysed to identify the median lethal effect concentration (LC50), the concentration of cigarette butt leachate resulting in 50% mortality. LC50 values were determined using the Trimmed Spearman-Kärber method, as outlined in US EPA 2002, using Comprehensive Environmental Toxicity Information System v1.6.3revE, Tidepool Scientific Software.^{9 10} To determine whether there were statistically significant ($p < 0.05$) differences in the toxicity of cigarette butt leachates, concentration- response curves were compared with an F test using Prism version 4.02, GraphPad Software, Inc.¹¹

Results

Toxicity of leachate from smoked cigarette butts

Leachate from smoked cigarette butts (SCB) (smoked filter + tobacco) was found to be acutely toxic to both the saltwater topsmelt (*Atherinops affinis*) and the freshwater fathead minnow (*Pimephales promelas*). An LC50 of approximately 1 cigarette butt/l of water was obtained for both species. The concentration-response curve for the topsmelt is shown in figure 1 and for the fathead minnow in figure 2. Survival in all laboratory controls was 90% or greater, as required by EPA protocol for test validity.⁹ For comparative purposes, this test was performed twice, once with artificially smoked cigarettes and again with naturally smoked cigarettes. Both methods of smoking the cigarette yielded similar results, as concentration-response curves for this test were not found to be statistically different (as $p > 0.05$) when comparing artificially smoked versus naturally smoked cigarette leachates for either fish species.

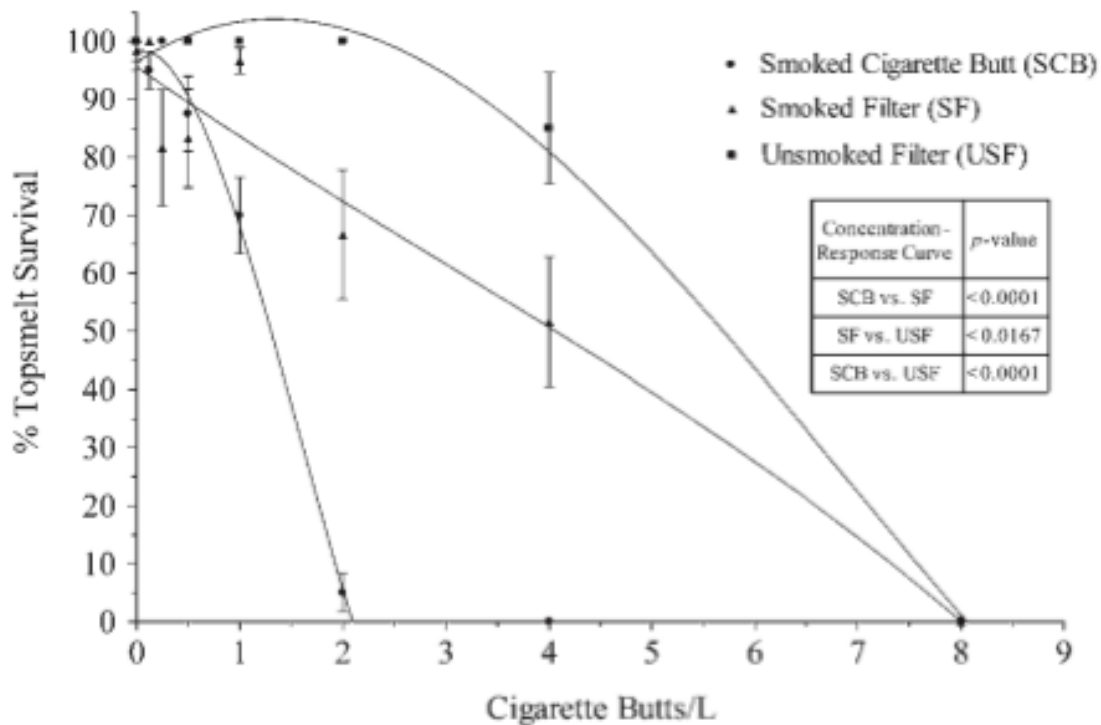


Figure 1 Concentration-response curves for topsmelt (*Atherinops affinis*). *LC*₅₀ values for leachate from smoked cigarette butts (SCB) (smoked filter + tobacco), smoked cigarette filters (SF) (no tobacco) and unsmoked cigarette filters (USF) (no tobacco) were determined to be 1.1, 1.8 and 5.1 cigarette butts/l, respectively. Survival in all laboratory controls exceeded 90%. Error bars represent one SE of the mean. Dose-response curves are significantly ($p < 0.05$) different.

Toxicity of leachate from smoked cigarette filters

Leachate from smoked cigarette filters (SF) (no tobacco) was also found to be acutely toxic to topsmelt at the concentration of 1.8 cigarette butts/l (figure 1), and to fathead minnows at 4.3 cigarette butts/l (figure 2). Survival in all laboratory controls was 90% or greater, as required by EPA protocol for test validity.⁹ The toxicity tests for smoked filters (SF) (no tobacco) were performed three times, once with artificially smoked cigarette filters and twice with naturally smoked cigarette filters. The different methods of smoking the cigarette yielded different results. Concentration-response curves for both species were found to be statistically different ($p < 0.05$) when comparing artificially smoked versus naturally smoked filter leachates. Artificially smoked filters were found to be more toxic than naturally smoked filters for both fish species. The reasons for this discrepancy are unclear.

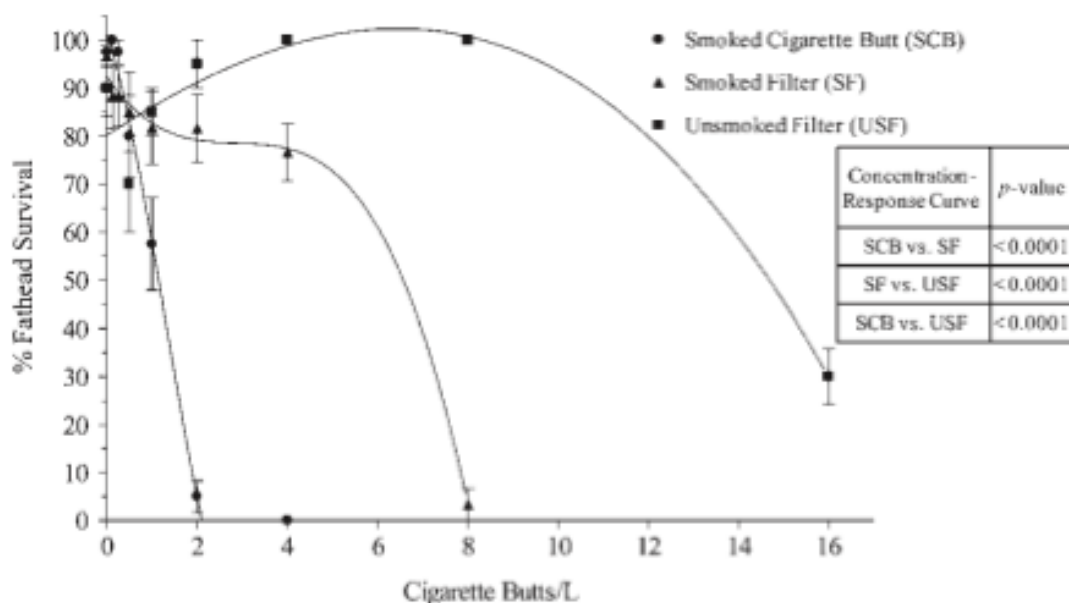


Figure 2: Concentration-response curves for the fathead minnow (*Pimephales promelas*). LC50 values for leachate from smoked cigarette butts (SCB) (smoked filter + tobacco), smoked cigarette filters (SF) (no tobacco) and unsmoked cigarette filters (USF) (no tobacco) were determined to be 0.97, 4.3, and 13.5 cigarette butts/l, respectively. Survival in all laboratory controls exceeded 90%. Error bars represent one SE of the mean. Dose-response curves are significantly ($p < 0.05$) different.

Toxicity of leachate from unsmoked cigarette filters

One surprising result of our study was that leachate from unsmoked cigarette filters (USF) (no tobacco) was found to be acutely toxic to both fish species with an LC50 value of 5.1 for the topsmelt (figure 1) and 13.5 cigarette butts/l for the fathead minnow (figure 2). Survival in all laboratory controls was 90% or greater, as required by EPA protocol for test validity.⁹

Discussion

Sensitivity of fish to smoked cigarette leachate compared to other species

A summary of toxicity (LC50 and EC50 values) from all research completed to date can be found in table 1. Results of a previous study found that smoked cigarette butt (SCB) leachate was acutely toxic to the daphnid, *Ceriodaphnia cf dubia*, at concentrations between 8.9 and 25.9 mg butts/l when remnant tobacco is left intact.⁸ Given that the mean weight of a single smoked cigarette butt is approximately 310 mg, it can be calculated that smoked cigarette butt (SCB) leachate was found to be acutely toxic to daphnids between 0.03 and 0.08 cigarette butts/l (48-hour EC50 (immobilisation)). A study conducted by Warne et al supports this finding, as a similar EC50 (48-hour (immobilisation)) of 0.06 cigarette butts/l was identified, utilising the same test species.⁷ However, a study conducted by Register found leachate from smoked cigarette tobacco (no filter) to be acutely toxic to *Daphnia magna* at slightly higher concentrations, between 0.125 and 0.25 cigarette butts/l (48-hour LC50).² In comparison, our current study found

smoked cigarette butt (SCB) leachate to be less toxic to topsmelt and fathead minnows, than to daphnids tested in previous studies, as the LC50 (96-hour) for fish was identified as approximately 1 cigarette butt/l.

The toxicity of smoked cigarette butts (SCB) has also been evaluated using a marine bacterium (*Vibrio fischeri*). Warne et al found SCB leachate to be acutely toxic to *V. fischeri* at 0.58 cigarette butts/l (30-minute EC50 (bioluminescence)) and Micevska et al supported this finding with a SCB leachate EC50 (30-minute bioluminescence) between 0.3 and 2.7 cigarette butts/l.⁸ Since fish were found to have an LC50 of 1 cigarette butt/l for this same cigarette leachate, fish and marine bacteria may have similar sensitivities to smoked cigarette butt (SCB) leachate.

Register found leachate from smoked cigarette filters (SF) (no tobacco) to be toxic to *D. magna* between 1 and 2 cigarette butts/l (48-hour LC50).² Warne et al found daphnids to be more sensitive to leachate from smoked filters (SF) (no tobacco), as leachate was found to be toxic to *C. cf dubia* at approximately 0.16 cigarette butts/l (48-hour EC50 (immobilisation)).⁷ Compared to the current study, fish were found to be less sensitive to smoked filter (SF) leachate than daphnids in previous studies, with LC50s of 1.8 and 4.3 cigarette butts/l for the topsmelt and fathead minnow, respectively.

The reason for the greater sensitivity of daphnids to cigarette butt toxicity, compared to fish, is currently unknown, but may be due to the presence of nicotine and/or pesticide residues in cigarette butt leachates, or to metabolic differences between the species. Daphnids, specifically *Daphnia magna* and *Ceriodaphnia dubia*, are largely herbivorous and detritivorous and are known to be more susceptible to nicotine than fish.¹²

Table 1 Toxicity summary

Species	Cigarette butts/l		
	USF	SF	SCB
Topsmelt LC50	5.1 (4.6–5.7)	1.8 (1.5–2.0)	1.1 (0.95–1.3)
Fathead minnow LC50	13.5 (11.4–15.9)	4.3 (3.7–5.1)	0.97 (0.84–1.1)
Daphnid (<i>D. magna</i>)* LC50	>16	1.0–2.0	0.125–0.25†
Daphnid (<i>C. cf dubia</i>)‡ EC50 (immobilisation)	NA	NA	0.03–0.08 (0.02–0.12)
Daphnid (<i>C. cf dubia</i>)§ EC50 (immobilisation)	1.7 (1.4–2.06)	0.16 (0.09–0.27)	0.06 (0.05–0.08)
Marine bacterium (<i>V. fischeri</i>)‡ EC50 (bioluminescence)	NA	NA	0.3–2.7 (0.3–3.5)
Marine bacterium (<i>V. fischeri</i>)§ EC50 (bioluminescence)	> 970	1.25 (1.21–1.33)	0.58 (0.53–0.63)

LC50 and EC50 values (with 95% CIs) for leachates from unsmoked cigarette filters (USF) (no tobacco), smoked cigarette filters (SF) (no tobacco), and smoked cigarette butts (SCB) (smoked filter + tobacco).

*Courtesy: Register.² No CIs reported.

†Test utilised smoked cigarette tobacco (no filter).

‡Courtesy: Micevska et al.⁸ 95% fiducial limits reported.

§Courtesy: Warne et al.⁷

Potential causes of toxicity

Pesticides, potentially remaining in unsmoked cigarettes, may contribute to the toxicity of cigarette leachate. Daphnids may be more sensitive to pesticides than are fish, which would explain the observed greater sensitivity to cigarette leachate with daphnids, compared to fish. A US Government Accountability Office report discusses the use of pesticides on cigarette tobacco crops.¹³ The US EPA regulates which specific pesticides

may be used on tobacco crops, as well as how they are used, but it does not regulate pesticide residues on tobacco, as is required for human foods and animal feed crops. The USDA, however, has found that some imported and domestic tobacco exceeds current residue limits considered safe for human health and environmental effects.¹³ A 2006 study performed by Dane et al also found three previously undetected pesticides (flumetralin, pendimethalin and trifluralin) in both mainstream and side-stream cigarette smoke, which could also be retained by the cigarette filters causing toxicity to aquatic organisms as they leach out of the cigarette butts.¹⁴

Micevska *et al* conducted toxicity identification evaluations (TIEs) on smoked cigarette butt leachates and found that nicotine and ethylphenol may play significant roles in causing the toxicity observed in daphnids and marine bacteria.⁸ Nicotine is an antiherbivore chemical derived from the tobacco plant *Nicotiana* sp and it has commonly been used as an insecticide.¹⁵ It has also been reported that ethylphenol is commonly used in the tobacco industry as a tobacco flavouring agent and is present in cigarette smoke.¹⁶⁻¹⁸ Ethylphenol has been shown to be capable of bioconcentration in aquatic organisms.¹⁹

Chemical additives are often introduced to make tobacco products more attractive to consumers. For example, sugars and humectants make smoke milder and easier to inhale, humectants can prolong shelf life, ammonia may enhance the delivery of nicotine and menthol and eugenol effectively numb the throat.⁵ In fact, approximately 600 additives were in use by major American cigarette companies in 1994.²⁰ Many of these chemicals may be harmful to humans as a result of smoking. The major humectants used for cigarettes are glycerol, diethylene glycol and/or propylene glycol which may be carcinogenic to humans.⁴ However, little is known about the fate of such additives in cigarette butt leachates.

There are several chemicals in an unsmoked cigarette filter that may contribute to aquatic toxicity. The filter of a filter-tipped cigarette is composed of cellulose acetate fibres.²¹ These fibres, each approximately 20 mm in diameter, are treated with titanium dioxide (a delustrant) and over 15000 of them are packed tightly together, using triacetin (glycerol triacetate) as a binding agent, to create a single filter.²²⁻²³ Most cigarette filters are surrounded by two layers of paper and/or rayon wrapping, which contain chemicals, such as glues to hold the paper together, and alkali metal salts of organic acids (eg, sodium acetate) in order to maintain burning while the cigarette is being smoked.²² It is also possible that cigarette filters attached to tobacco absorb toxicants from the adjacent unsmoked tobacco column; however, this has not been investigated in the literature.

Toxicity of leachate from smoked cigarette butts, smoked filters and unsmoked filters

Both fish species exhibited statistically different concentration-responses to the different cigarette leachates, as reported by the p values in figures 1 and 2. For both fish species, the toxicity increased significantly from unsmoked filters (USF) to smoked filters (SF) to smoked cigarette butts (SCB). These findings are consistent with findings published by Register and Warne et al, who also found a progressive increase in toxicity from USF to SF to SCB.²⁻⁷ Although, it has been shown that less than 2% of the quantity of all elements in cigarette tobacco and paper adsorb onto the filter as a result of smoking, our results show that the chemicals solely in the smoked filter still exert considerable toxicity to fish.²⁴ However, the remnant tobacco of the cigarette butt contributed a degree of toxicity (to both topsmelt and fathead minnows) significantly ($p < 0.05$) greater than that

conferred by chemicals trapped and leached from the smoked filter itself. Remnant tobacco comprised unburned tobacco as well as a burnt tobacco tip and including such remnant tobacco effectively exacerbated toxicity. The chemicals in smoked cigarette butts (SCB) may be significantly greater and different from those retained within the smoked filter (SF) itself; the former may contain additional toxic products of combustion. Chemicals in smoked versus unsmoked cigarette butts may not only contribute differently to toxicity, but also may have different fates and/or potential for bioaccumulation in the environment.

Despite the gathering evidence on the toxicity of cigarette butt leachates to various organisms, it is difficult to assess the risk that cigarette waste may have on the actual aquatic environment. Pathways of cigarette waste to aquatic environments are complex and varied. In 2002, a hazard assessment concluded that, while definitive quantification is still needed, it is likely that littered cigarette butts pose a low to moderate risk to aquatic organisms.⁷ However, aside from toxicity, little is known about the specific chemicals, fate and bioaccumulation potential of such cigarette butt leachates, and the actual effects they may have on aquatic life. This study represents the first in the literature to show that cigarette butt leachate is toxic to representative marine and freshwater fish species. Additional research is necessary to explore the actual risks that cigarettes pose to freshwater and marine environments.

What this paper adds

- Cigarette butts are the most common form of litter in the world. Thousands of chemicals are present in a cigarette, the residues of which may be found in littered cigarette butts. Previous studies have shown chemicals in cigarette butt leachate can be acutely toxic to aquatic organisms; however, all previous studies used non-vertebrate species for testing.
- This study represents the first in the literature to show that leachate from cigarette butts is acutely toxic to representative marine and freshwater fish species. Leachates from smoked cigarette butts with remnant tobacco were significantly more toxic to fish than the smoked filters alone, but even unsmoked filters exhibited a small level of toxicity.

Conclusion

- Smoked cigarette butts (SCB) (smoked filter + tobacco), smoked cigarette filters (SF) (no tobacco) and unsmoked cigarette filters (USF) (no tobacco) were all found to be acutely toxic to representative marine and freshwater fish.
- Remnant tobacco was found to contribute a degree of toxicity above that which was conferred by the smoked filter alone.
- Fish were found to be less sensitive to cigarette butt leachate than daphnids previously tested, but to have a similar sensitivity as marine bacteria.
- Smoking was found to increase the toxicity of cigarette filters.

References

1. Novotny TE, Lum K, Smith E, et al. Cigarettes butts and the case for an environmental policy on hazardous cigarette waste. *Int J Environ Res Public Health* 2009;6:1691e705.
2. Register K. Cigarette butts as litter-toxic as well as ugly? *Bull Am Litt Soc* 2000;25:23e9.
3. Sheets TJ. Pesticide residues on tobacco: Perceptions and realities. *Rec Adv Tobacco Sci* 1991;17:33e70.
4. Hoffmann D, Hoffmann I. The changing cigarette, 1950e1995. *J Toxicol Environ Health* 1997;50:307e64.
5. Glantz SA, Slade J, Bero LA, et al. *The Cigarette Papers*. Berkley, CA: University of California Press, 1996:202e35.
6. Moriwaki H, Kitajima S, Katahira K. Waste on the roadside, 'poi-sute' waste: its distribution and elution potential of pollutants into environment. *Waste Manag* 2009;29:1192e7.
7. Warne MStJ, Patra RW, Cole B, et al. Toxicity and a Hazard Assessment of Cigarette Butts to Aquatic Organisms [abstract]. *Interact 2002-Programme and Abstract Book*. Sydney: The Royal Australian Society Chemical Institute, The Australasian Society of Ecotoxicology and The International Chemometrics Society, 2002:192.
8. Micevska T, Warne MStJ, Pablo F, et al. Variation in, and causes of, toxicity of cigarette butts to a cladoceran and microtox. *Arch Environ Contam Toxicol* 2006;50:205e12.
9. United States Environmental Protection Agency. *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*. 5th edn. Washington, DC: US EPA, 2002. EPA 821/R-02/012.
10. Hamilton MA, Russo RC, Thurston RV. Trimmed Spearman-Kärber method for estimating median lethal concentrations in toxicity bioassays. *Environ Sci Technol* 1977;11:714e19.
11. Motulsky H, Christopoulos A. *Fitting Models to Biological Data Using Linear and Nonlinear Regression*. New York: Oxford University Press, 2003:134e59.
12. Konar SK. Toxicity of nicotine to aquatic life. *Indiana J Fish* 1977;24:124e8.
13. United States Government Accountability Office. *Pesticides on Tobacco*. Washington, DC: US Government Printing Office, 2003.
14. Dane AJ, Crystal DH, Kent JV. The detection of nitro pesticides in mainstream and sidestream cigarette smoke using electron monochromator-mass spectrometry. *Anal Chem* 2006;78:3227e33.
15. Rodgman A, Perfetti TA. *The Chemical Components of Tobacco and Tobacco Smoke*. Boca Raton, FL: CRC Press, 2008:933.
16. RJ Reynolds Tobacco Company. *Cigarette Ingredients: A Complete List and Background*. Winston-Salem, NC: R.J. Reynolds Tobacco Company, 1994. <http://www.rjrt.com/tobaccoingredients.aspx> (accessed 20 Dec 2010).
17. Triest FJ. Smokers' flavor concepts evolving as additives' importance increases. *Tob*

Int 1979;181:20e1.

18. Clark TJ, Bunch JE. Quantitative determination of phenols in mainstream smoke with solid-phase microextraction-gas chromatographic-selected ion monitoring mass spectrometry. *J Chromatogr Sci* 1996;34:272e5.

19. Hazardous Substances Data Bank. 4-Ethylphenol. Toxnet, National Library of Medicine. <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB> (accessed 20 Dec 2010).

20. Doull J, Frawley JP, George W. List of Ingredients Added to Tobacco in the Manufacture of Cigarettes by Six Major American Cigarette Companies. Washington, DC: Covington and Burling, 1994.

21. United States Department of Health and Human Services. Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General. DHHS Publication No. (CDC) 89e8411. Rockville, MD: Public Health Service, Centers for Disease Control, Office on Smoking and Health, 1989.

22. Norman A. Cigarette manufacture: cigarette design and materials. In: DaviDL, Nielsen MT, eds. Tobacco: Production, Chemistry and Technology. Oxford, UK: Blackwell Science, 1999:353e87.

23. Pauly JL, Mapani AB, Lesses JD, et al. Cigarettes with defective filters marketed for 40 years: what Philip Morris never told smokers. *Tob Control* 2002;11:i51e61.

24. Iskander FY. Neutron activation analysis of an Egyptian cigarette and its ash. *J Radioanal Nucl Chem* 1985;89:511e18.

Research paper Tobacco Control 2011;20(Suppl 1):i25ei29. doi:10.1136/tc.2010.040170i29

Tob Control: first published as 10.1136/tc.2010.040170 on 18 April 2011. Downloaded from <http://tobaccocontrol.bmj.com/> on February 11, 2022 by guest.

15. Borland R, Wilson N, Fong GT, et al. Impact of graphic and text warnings on cigarette packs: findings from four countries over five years. *Tob Control* 2009;18:358e64.

16. Trade Practices (Consumer Product Information Standards) (Tobacco) Regulations. Commonwealth of Australia Statutory Rules 2004. 2004. No. 264. <http://www.comlaw.gov.au/ComLaw/Legislation/LegislativeInstrumentCompilation1.nsf/all/search/0AE4DEC91A2D84E3CA2572870013926E> (accessed 26 Jul 2010).

17. Scollo M, Haslam I. Attachment 12.1. health warnings. In: Scollo MM, Winstanley MH, eds. Tobacco In Australia: Facts And Issues. 3rd edn. Melbourne: Cancer Council Victoria, 2008. <http://www.tobaccoinaustralia.org.au> (accessed 1 Feb 2011).

18. Cancer Institute. Amputation. New South Wales. http://www.cancerinstitute.org.au/cancer_inst/campaigns/media/Final_gangreneTVC.mpg (accessed 26 Jul 2010).

19. Quit Victoria. Mouth Cancer Talks. <http://www.quit.org.au/media/article.aspx?ContentID14mouth-cancer> (accessed 1 Feb 2011).

20. Australian Government Department of Health and Ageing. Tobacco Warnings Cigarette Packets Set A. <http://www.quitnow.info.au/internet/quitnow/publishing.nsf/Content/warnings-brochure-a> (accessed 26 Jul 2010).

21. Australian Government Department of Health and Ageing. Tobacco Warnings Cigarette Packets Set B. <http://www.quitnow.info.au/internet/quitnow/publishing.nsf/Content/warnings-b> (accessed 26 Jul 2010).
 22. Australian Government Department of Health and Ageing. Health Warnings Campaign, 2006. <http://www.quitnow.info.au/internet/quitnow/publishing.nsf/Content/warnings-lp> (accessed 26 Jul 2010).
 23. Quit Victoria. Bubblewrap. http://www.quit.org.au/media/article.aspx?ContentID1/4_lung-disease (accessed 1 Feb 2011).
 24. Weinstein ND, Slovic P, Waters E, et al. Public understanding of the illnesses caused by cigarette smoking. *Nicotine Tob Res* 2004;6:349e55.
 25. Australian Bureau of Statistics. Information Paper. An Introduction To The Socio- Economic Indexes For Areas (SEIFA) 2006. Canberra, Australia: Catalogue No. 2039.0, 2008.
 26. DiClemente CC, Prochaska JO, Fairhurst SK, et al. The process of smoking cessation: an analysis of precontemplation, contemplation, and preparation stages of change. *J Consult Clin Psychol* 1991;59:295e304.
 27. Durkin S, Wakefield M. Interrupting a narrative transportation experience: program placement effects on responses to anti-smoking advertising. *J Health Commun* 2008;13:667e80.
- Correction
28. Durkin S, Wakefield M. Maximising the impact of emotive antitobacco advertising: effects of interpersonal discussion and program placement. *Soc Mar Q* 2006;12:3e14.
 29. Durkin S, Wakefield M. Comparative responses to radio and television anti-smoking advertisements to encourage smoking cessation. *Health Promot Int* 2010;25:5e13.
 30. Germain D. Graphic Health Warning Intercept Study-Final. Research Memorandum
Prepared for Quit Victoria. Melbourne: Centre for Behavioural Research in Cancer, Cancer Council Victoria, 2008.
 31. Australian Bureau of Statistics. Population By Age And Sex, Australian states and territories-2006 Census Edition: Final. Canberra, Australia: Australian Bureau of Statistics, 2008. Catalogue No. 3201.0.
 32. Australian Institute of Health and Welfare. National Health Data Dictionary. Version 8.0. Canberra, Australia: Australian Institute of Health and Welfare, 1999.
 33. Wakefield M, Durkin S, Spittal M, et al. Impact of tobacco control policies and mass media campaigns on monthly adult smoking prevalence. *Am J Public Health* 2008;98:1443e50.
 34. World Health Organization. WHO Framework Convention on Tobacco Control. <http://whqlibdoc.who.int/publications/2003/9241591013.pdf> (accessed 24 Jul 2010).
 35. World Health Organization. WHO Framework Convention on Tobacco Control. Guidelines for implementation Article 5.3; Article 8; Article 11; Article 13. http://whqlibdoc.who.int/publications/2009/9789241598224_eng.pdf (accessed 24 Jul 2010).

36. Burns DM. Reducing tobacco use: what works in the population? *J Dent Educ* 2002;66:1051e60.
 37. Levy DT, Chaloupka F, Gitchell J. The effects of tobacco control policies on smoking rates: a tobacco control scorecard. *J Public Health Manag Pract* 2004;10:338e53.
 38. Siegel M. The effectiveness of state-level tobacco control interventions: a review of program implementation and behavioral outcomes. *Annu Rev Public Health* 2002;23:45e71.
 39. US Department of Health and Human Services. Reducing Tobacco Use: A Report Of The Surgeon General-Executive Summary. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2000.
-

Previously published: Slaughter, Elli, *et al.* "Toxicity of cigarette butts, and their chemical components, to marine and freshwater fish." *Tobacco control* 20.Suppl 1 (2011): i25-i29.

https://tobaccocontrol.bmj.com/content/tobaccocontrol/20/Suppl_1/i25.full.pdf

Ecological Problems of Enterprises of Alcohol Industry

by Marianna Havryshko, Olena Popovych, and Halyna Yaremko

Abstract

The issue of industrial water treatment and food waste disposal is particularly relevant, especially for the alcohol industry. The problem of wastewater treatment and waste accumulation in the process of alcohol production is due to high chemical and biological oxygen demand, specific colour and odour, a large number of suspended substances, low pH. Therefore, the choice of promising wastewater treatment technologies is of paramount importance to ensure the ecological safety of the environment. The purpose of the paper is 1) to analyze the state of the alcohol industry in Ukraine in recent years, and methods of its waste disposal; 2) to investigate and determine effective methods of waste disposal in the alcohol industry.

1. Introduction

At present, the gradual introduction of the balanced use of natural resources concepts and ecologically safe, energy-efficient development of industrial and production enterprises is taking place. The major purpose of their implementation is to ensure that the human needs for resources do not conflict with the priorities of environmental protection and human health.

Therefore, the capacity growth of the alcohol industry at the present stage of the food industry development leads to the formation of enormous volumes of wastewater from the production process (1 litre of ethanol is accompanied by the formation of 12- 14 litres of wastewater).

Due to the unsatisfactory current state of treatment facilities and low efficiency of technological processes of treatment and utilization in Ukraine, wastewater is one of the main factors of hydrosphere

pollution, and sludge being one of the significant factors of lithosphere pollution, which in turn creates a number of environmental risks.

In the conditions of constant deterioration of the environment, improving the quality of wastewater treatment before discharge and improving the organoleptic and other characteristics of the formed sediments, before their disposal is an urgent task today.

Thus, there appears a scientific and applied problem of creating new and improving existing environmentally friendly technological processes of treatment and disposal of industrial and municipal wastewater, which will ensure the rational use of available renewable resources.

Theoretical, practical, and methodological issues related to the use of food industry waste and their social and economic consequences are the subject of scientific interests of many domestic and foreign scholars [1]. Examining the economic aspects of the waste impact consequences on the world's natural resources, T. Zinchuk notes that all countries of the world, regardless of the level of their resources, feel the same negative impact of human production activities on the ecological balance, environment and natural resources, the state of which deteriorates dramatically and leads to the gradual loss of food security [2].

Problems of rational use of renewable resources, creation of new and improvement of existing ecologically safe technological processes of purification and utilization of industrial and municipal sewage, are reflected in the works of S. Shamansky. In particular, according to his assertion, treatment plants are a potential source of additional raw materials, which are now considered waste, as well as non-traditional energy sources, the potential of which is not fully used, primarily due to shortcomings of modern wastewater treatment technologies [3].

Current world trends in the use of alcohol products allow us to solve some interrelated problems of social and environmental nature. Thus, recently, technologies aimed at improving the quality of fuel with the use of high-octane oxygen-containing additives to gasoline have become increasingly important, which allows to include blended gasoline to biofuels. Solving this problem will simultaneously solve some problems in consumer industries, namely energy and refining industries. Also, the use of high-octane oxygen- containing additives to gasoline in the production of biofuels will significantly improve the environmental situation, especially in the cities [4].

Ukraine annually consumes about 200 million tons of fuel and energy resources and is an energy- deficient country because it covers its energy needs by about 53 % and imports 75 % of the required volume of natural gas and 85 % of crude oil and petroleum products. Such a structure of the fuel and energy complex is economically impractical, creates the dependence of Ukraine's economy on oil and gas exporting countries, and is a threat to its energy and national security. It is also known that, based on the assessment of global oil reserves, the era of its depletion is approaching. Naturally, this will significantly exacerbate the energy problems of most countries. Therefore, the world economy pays great attention to the use as an energy source of renewable raw materials - ethyl alcohol as biofuel. Biofuel, which includes high-octane oxygen- containing additives to gasoline, is the energy resource of biological origin, the major feature of which is its renewable ability [5].

The goals of the article are the analysis of the current state and the main environmental aspects of the alcohol industry development, including Ukraine as well as identifying the promising areas of utilization and the use of waste from the alcohol industry of Ukraine as secondary raw materials, on the example of Ukrspyrnt State Enterprise. The aim of the study is to find the effective methods of utilization and the levers of state regulation that can direct the enterprises of the alcohol industry to energy efficiency and implementation of socially important environmental and economic tasks.

2. Experimental part

The alcohol industry is focused on raw materials. Alcohol is used in more than 150 industries. The raw material base for alcohol production is molasses, defective sugar,

grain, potatoes. Usually, distilleries are located in small settlements. Most alcohol in Ukraine is produced from waste from sugar industry.

The alcohol industry of Ukraine includes 79 state- owned production sites, including 41 (only 12 of which operate) are the part of Ukrspyrnt State Enterprise, a

leading producer of food alcohol. The total loss of enterprises that form the alcohol industry in 2018 reached UAH 25.7 million, only 8 of the 21 state-owned enterprises got a profit, and 11 enterprises are in bankruptcy [6].

The total production capacity of Ukrspyrnt State Enterprise is over 36 million decalitres per year. In January 2020, Ukrspyrnt State Enterprise officially sold 440, 60 thousand decalitres of alcohol. At the same time, for the same period last year, only 255, 17 thousand decalitres were sold [7], which will proportionally lead to a decrease in the number of effluents by almost twice.

Vodka and alcoholic beverages make up the largest share in the structure of sales of ethyl rectified alcohol by distilleries [7].

In terms of raw material consumption, alcohol production is the largest biotechnological production in the world, and ethanol is the third largest in terms of gross product value.

Varieties of alcohol (ethyl alcohol, technical bioethanol, food alcohol, technical alcohol, medical alcohol, alcoholic beverages) depend on the type of raw material, yeast strains, quality of distillation, degree of dilution, denaturation, etc.

Today, all fuel ethanol is produced biotechnologically by fermentation (yeast) or sugars (sugar cane), or starch- containing raw materials (mostly corn).

The main wastes of alcohol production, depending on the substrate, are post-alcohol molasses, post-alcohol grain and post-yeast molasses bard with pH = 4.5-7.0, which after evaporation is disposed of for feed, fertilizer, feed additive, feed yeast, production of drugs (acidin, glutamate), etc. Per 1,000 dal of alcohol, 140 m³ of grain bard is formed, and 12,000 dal of molasses bard, on which fodder sugarmycetes are produces.

Production of 1 litre of ethanol is accompanied by the formation of 12-14 litres of wastewater. [8].

According to the data given in the research of T. Melnychenko, V. Kadoshnikov, K. Zhebrovska, O. Petrenko, O. Puhach “Introduction of advanced technologies of waste utilization at the objects of alcohol industry - a guarantee of environmental protection” at different enterprises, the composition and amount of wastewater differ significantly. Table 1 shows the characteristics of wastewater from alcohol enterprises, which use molasses as raw material [9].

Molasses post-alcoholic bard contains a large number of nutrients (in terms of dry reducing substances (4–6 %), colloidal Dumansky (13–15 %), potassium (8.5–13 %), sodium (1.3–2,5 %), calcium (0.5–2.5 %), sulfate ions (0.6–4.6 %), chloride ions (0.9–3.0 %).

Traditionally, fresh bard in its natural form was used for fattening cattle on collective farms and fattening farms. Glycerin (only at Lokhvytsya Ecological problems of enterprises of alcohol industry 109 Distillery), glutamic acid and monosodium

glutamate, vitamin B12 (KMB-12) were obtained from it by betaine, medical acid, feed yeast, feed concentrate of processing [9].

Characteristics of wastewater from alcohol enterprises, which use molasses as raw material. **Table 1.**

Characteristics of wastewater from alcohol enterprises, which use molasses as raw material

Indicators	Category of wastewater				Primary bard	Secondary bard
	first	second	fourth	fifth		
Temperature, C	30-60	20-100	80-100	20-90	95-98	25-30
Odor, points	0-3	3-5	4-7	3-64	5,0	5,0
pH	7,0-8,0	8-12	4,4-6,4	5,5-6,2	5,0-5,5	4,5-5,0
Transparency, sm	12-30	10-25	15-25	0-2	0	0
Dry residue, g/l	0,35-0	13-20	0,3-0,6	0,45-10,0	70-85	50-65
COD, mg O ₂ /l	5-40	10-40	60-350	1000-4000	49000-66900	20000-48000
BOD ₂₀ , mg O ₂ /l	5-12	5-80	180-300	950-4500	44000-59000	18000-40000
BOD ₅ , mg O ₂ /l	2-10	2-40	100-2500	600-3700	29000-48000	15500-29900
Nitrogen total, mg/l	-	-	-	-	2500-3860	940-2500
Volatile acids, mg/l	-	-	-	-	2300-3900	300-720

Characterization of wastewater is necessary to determine the method of treatment, the possibility of discharge into reservoirs, the presence of valuable or toxic impurities. The methods for wastewater treatment, which is later submitted for further treatment in compliance with all water quality requirements provided by law, are determined then.

The composition of wastewater and its properties are evaluated by the results of sanitary and chemical analysis, which consists of a number of physical, physico-chemical and sanitary-bacteriological determinations.

The great diversity of the composition of effluents and the impossibility of analyzing each of the polluting components leads to the need to choose such indicators that would describe certain properties of water without the identification of individual substances. Such indicators are called group (total). Complete sanitary and chemical analysis includes the characteristics of the following indicators: temperature, color, odor, transparency, suspended solids by volume and mass, permanganate oxidation, chemical oxygen demand (COD), biochemical oxygen demand (BOD), pH, dry residue, dense residue and puncture losses, surfactants, petroleum products, dissolved oxygen, microbial count, Escherichia coli bacteria (ECD), helminth eggs, nitrogen (total, ammonium, nitrite, nitrate), phosphates, chlorides, sulfates, heavy metals and other toxic elements.

In addition to these indicators, the mandatory tests of complete sanitary and chemical analysis at municipal treatment plants include the determination of specific impurities entering the drainage system of settlements from industrial enterprises.

Requirements to the composition and properties of wastewater of enterprises for their safe disposal by the sewerage network according to appendix 1 to the

“Rules of wastewater acceptance of enterprises in communal and departmental sewerage systems of settlements of Ukraine”, approved by the order of the State Construction Committee of Ukraine of February 19, 2002 N 37 [10].

In Ukraine, the technology of wastewater treatment of distilleries, developed by the Department of Ecology of UkrNDIsprytbioproduct, provides:

- purification of Lutheran waters at bio-treatment plants and return to production;

– cleaning of post-alcoholic grain bard by centrifugation or vacuum filtration to obtain 25 % of the pellet, which is dried on a drum or disk dryer with a yield of 7 tons of protein feed per 1000 dal of alcohol;

–cooling of the liquid fraction (100 tons of filtrate per 1000 dal of alcohol) to 35–45 ° C and the implementation of two-stage anaerobic-aerobic purification to obtain biogas [8].

Fig.1 shows the basic technological scheme of the most effective mechanical and biological treatment of industrial and domestic sewage to pure ecologically safe, biologically high-grade water. For mechanical treatment, wastewater 3 passes through the grids 4, where coarse mechanical impurities are retained, then through the sand trap 5, where the sand is separated, and finally enters the primary settling tanks 6, where under gravity everything heavier than water settles to the bottom. After that, the water is pumped into the methane tanks 1 for fermentation, with the release of methane gas, and after a full period is released on sludge sites with drainage 2, and everything lighter than water rises to the water surface, where it is collected by special devices in the hopper and also goes to the methane tank. At all the stages of water passing through treatment plants, biological processes take place in it. But the most noticeable biological wastewater treatment occurs at the second biological stage. In a bioreactor with a biofilm, the biomass of aquatic organisms 7, which increases during water purification, is separated in secondary settling tanks 8, from here it is fed either to methane tanks 1 or to sludge sites 2. Water purification consists of its complete disinfection, that is, in the destruction of epidemically dangerous organisms and vibrios in the water. For this purpose chlorination, irradiation with ultraviolet light, and less often ozonation are used. When treating treated wastewater with chlorine, it is incubated for 20-30 min in contact tanks 10, and then discharged into open water. Some scientists consider chlorination of wastewater absolutely unacceptable. Therefore, a reliable scheme has been developed, which includes processes of treatment with flocculants and coagulants in the apparatus 11, settling 12, filtration through sand 13, and finally through activated carbon 14. The sludge in this scheme is concentrated on filters 15 and sent to the landfill.

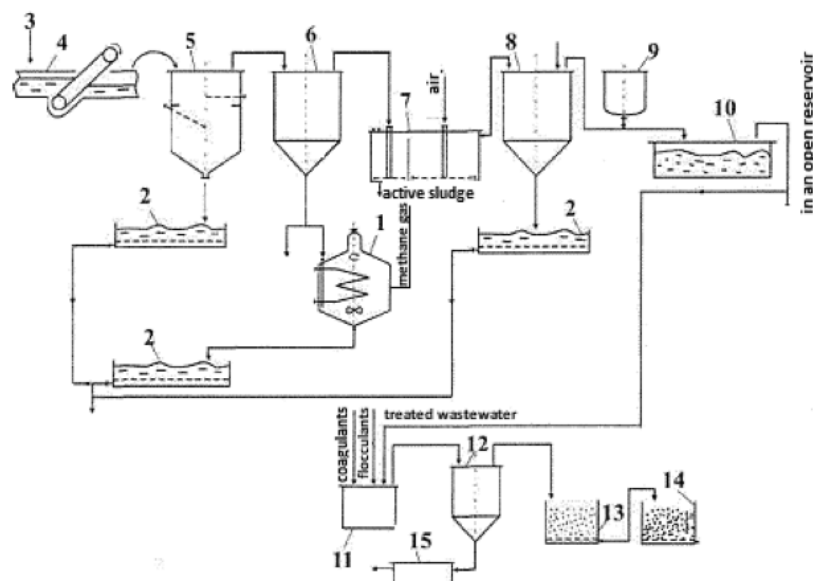


Fig. 1 Schematic diagram of mechanical, biological and chemical wastewater treatment:

1 – methane tank; 2 – silt sites; 3 – wastewater; 4 – lattice; 5 – sand trap; 6 – primary settling tank; 7 – bioreactor (aeration tank with biofilm); 8 – secondary settling tank; 9 – capacity for chlorination; 10 – contact tank; 11 – capacity for flocculation and coagulation; 12 – settling tank; 13 – sand filter; 14 – filter with activated carbon; 15 – sludge thickener [11]

Due to the formation of a large volume of post- alcohol bard (12-15 dm³ per 1 dm³ of alcohol), simple methods of its utilization, such as cleaning in the filtration fields, the use as raw feed for cattle, fermentation, do not solve the problem completely.

Since bard has a fairly high humidity (90–95 %), the use of physical and chemical methods, namely drying to get dry feed DDGS, requires expensive equipment and high energy consumption. Cultivation of feed yeast biomass, methods of aerobic and anaerobic fermentation also have several disadvantages (formation of culture fluid, swelling of activated sludge, the inability of the system to reduce high BOD or COD, which requires high-quality integrated solutions).

Cultivation of feed yeast biomass on PSB requires the installation of additional facilities for purification of culture fluid. To dispose PSB by anaerobic digestion, it is necessary to pre-treat it (separation of liquid and solid phases, ozonation, etc.) in order to provide additional substances to stabilize the pH and nutrients, which increase the cost of the process.

3. Results of the investigation monitoring

Examples of methods used to treat wastewater from the alcohol industry are adsorption, wet oxidation, ozone treatment and ion exchange, removal of chromophores using hydrogenation biological batch reactors, and colour (adsorbed organic halogens) removal by advanced oxidation processes. There are several ways to remove the colour from the industrial wastewater of distilleries. It is difficult to break down melanoidins by microorganisms. Various disadvantages of the above methods are overcome by the method of electrocoagulation.

Therefore, wastewater from wastewater treatment systems still contains a high content of colour, melanoidins and COD.

The energy consumption required for wastewater treatment in the food industry is from 10 to 15 % of total energy consumption. It is mainly used in aerobic treatment using oxidized organic compounds. At the same time, anaerobic methods of methane fermentation provide biogas with a methane content of 50 to 70 %, thus saving electricity compared to aerobic treatment methods.

Wastewater treatment technology in France. In France, 15 food industry enterprises are equipped with anaerobic wastewater treatment systems with organic contaminants. They use methane tanks with a capacity of 25 to 5,000 cubic meters. The world's largest methane tank operates on the principle of an anaerobic filter and has a capacity of 13 thousand cubic meters (Puerto Rico, rum plant).

The method of methanogenic wastewater fermentation is appropriate in the food industry due to the high concentration of contaminants in insignificant amounts of water, the soluble nature of organic contaminants, and the favourable temperature of wastewater (30-35 ° C).

India is the largest producer of ethanol in Asia. Most distilleries in India use the anaerobic blanket reactor or its variants with subsequent settling / filters and aerobic treatment processes. This process is able to remove approximately 70 % of COD and 80–90 % of BOD. Wastewater from settling tanks / filters is called effluent biodegradable (BDE). BDE still contains very high levels of COD and BOD. This BDE is further treated aerobically. Although large plants around the world use complex treatment technologies, including physical, chemical and biological methods, small enterprises (plants) suffer from the lack of proper treatment systems due to financial constraints.

Analyzing the research of M. Potapova published in the article “Modern methods of processing and disposal of grain post-alcohol bard” we see that one of the promising methods of PSB utilization is aerobic fermentation. It has been argued that the use of cofermentation of the raw bard with bird droppings allows: to balance the nutrients, to bring the pH to the required for the process of methanogenesis, to achieve the desired ratio C: N. Under the conditions of cofermentation, a biogas yield of 265 cm³ / g COP with a methane content of 72 ± 2 % is achieved.

It is planned to develop a mathematical model for the control of the technological process of obtaining biogas from post-grain bard depending on environmental conditions and the ratio of PSB: manure [2].

Analyzing the activity of Ukrspyrty State Enterprise, we have found that one of the products of the industry is bioethanol dehydrated, denatured, which is used for the production of gasoline, biofuels, ethyl tert- butyl ether, functional additives and additives to motor fuel. Bioethanol dehydrated is used as a component of automotive fuel for vehicles with petrol engines, which meets the requirements of EN 228 and is used for mixing in any quantities.

The organization of production of alternative motor fuel with bioethanol content allows the use of environmentally friendly component in motor fuel, which significantly reduces emissions of toxic substances, reduces dependence on energy imports, and improves the overall environmental situation in the country [9].

Currently, Ukrspyrty produces 150 thousand tons of bioethanol per year and carries out the reconstruction of enterprises, which will provide the Ukrainian market with this product. It is known that 15 distilleries are ready to produce biofuels. And with the

beginning of full-scale production of bioethanol, Ukraine can establish exports of this product [12].

However, modern bioethanol production also requires wastewater disposal.

Conclusions

Increasing its capacity, the alcohol industry enhances the volume of waste, including the volume of wastewater that needs to be effectively treated before being released into the environment.

At the factories of the alcohol industry, basically all wastewater is treated at the factory treatment facilities (stations). The methods of wastewater treatment are necessary before transferring wastewater to biochemical treatment plants, before the discharge into reservoirs, or before regeneration in the circulating water supply system of the plant.

Biological methods of purification from organic substances play an important role in the enterprises of the alcohol industry. These methods are based on the use of microorganisms that convert organic compounds into nutrients and energy sources. Organic compounds decompose due to oxidation by anaerobic purification.

The analysis of wastewater is required to determine the method of treatment, the possibility of release into water bodies, the presence of valuable or toxic impurities.

Effective modern methods can clean wastewater from organic pollution by 85–95 %. They have only a small amount of surfactants, dissolved mineral salts, and other compounds.

Oxygen-free wastewater treatment in methane tanks is widely used in the food industry to produce energy biogas and bioorganic fertilizers (activated sludge).

One of the most effective environmental directions of the alcohol industry is the introduction of the set of measures that will ensure the production of alcohol and its by-products with the lowest content of harmful substances, and prevent the violation of ecological balance in the environment, which is realized by the development and implementation of the latest environmentally friendly technologies for the production and disposal of its waste.

References

- [1] Shved O. and Novikov V.: *Ekolohichna biotekhnolohiya*. chast.1, L'viv 2011, 250. (in Ukrain).
- [2] Holub, N. and Potapova, M.: *InnovBiosystBioeng*, 2018, 2 (2), 125 – 134.
- [3] Mel'nychuk O.: *Ekonomika i derzhava*, 2012. No 2, 15 – 21. [4] Zhonler I. V.: *Ahroperspektyva*, 2012, No 8, 27 – 35. [5] *Elektronnyy resurs* [<https://er.nau.edu.ua/handle/NAU/38570/>]
- [6] Tymchak V. S.: *Ekonomika APK*, 2016, No 10, 102-109.
- [7] Zinchuk T. O.: *Orhanichne Vyrobnystva I Prodovol'cha*

Bezpeka, Zhytomyr, Polissya, 2014, 103-108.

[8] Elektronnyy resurs [<http://www.ukrstat.gov.ua>].

[9] Elektronnyy resurs [<http://www.ukrspirt.com>].

[10] Elektronnyy resurs [<http://zik.ua>] rezhym dostupu.

[11] Mel'nychenko T. I. and Kadoshnikov V. M. and

Zhebrovs'ka K. I. and Petrenko O. D. and Puhach O. V.: Hihiyena naselenykh mist'. No 68, Ukrain, Kyiv, 2018, 77

[12] Elektronnyy resurs [<https://zakon.rada.gov.ua/laws/show/z0403-02>].

[13] V. O. Marynchenko: Tekhnolohiya spyrtu, Kyiv NUKHT, 2003, 495.

Previously published as: Havryshko, Marianna, Olena Popovych, and Halyna Yaremko. "Ecological Problems Of Enterprises Of Alcohol Industry." *Environmental Problems* 5, no. 2 (2020): 107-112.

Appropriating the Literature: Alcohol Industry Actors' Interventions in Scientific Journals

by Andrew Bartlett and Jim McCambridge

Abstract

Objective: One research group has recently published three articles on the ways in which alcohol companies and industry social aspects organizations (SAOs) communicate with the public. These articles show how the information produced by the alcohol industry works to produce doubt and uncertainty. Replies from SAOs were published in the respective scientific journals. This article examines these “moments of controversy,” asking in what ways, on which grounds, do the SAOs contest the claims made about them? **Method:** Three moments of controversy were examined, prompted by articles on SAO information on cancer, on use of Twitter, and on pregnancy and fertility. The articles ($n = 3$), the responses from the SAOs ($n = 8$), and the replies by authors Petticrew and colleagues ($n = 4$), were analyzed, identifying the rhetorical repertoires at work. **Results:** The responses by SAOs use two main strategies: 1. Posing narrow questions of accuracy rather than engaging with the overall findings of the articles on the context and framing of information; and 2. Making normative claims about what it is to do good science, suggesting that the articles and their findings are not. The second strategy questions the very legitimacy of research examining SAOs. The credibility of being published in the scientific literature affords the responses themselves a rhetorical function, a resource for later use to signal doubt and uncertainty. **Conclusions:** The SAO interventions in the scientific literature generate controversies. Furthermore, the published traces they leave in the scientific literature enhance SAOs' ability to make credible claims that the original findings were controversial. (*J. Stud. Alcohol Drugs*, 82, 595–601, 2021)

Introduction

We have known for some time that powerful industry actors such as tobacco companies have sponsored and shaped science in deliberate attempts to distort the scientific consensus on the damage caused by their products. There are well-documented examples of how industries have worked to create doubt as to the status of knowledge claims in order to prevent or delay regulatory actions (Oreskes & Conway, 2011). When the consensus is disputed, scientists are often not the audience at all. In the case of tobacco, the purpose was to create doubt in the public and uncertainty for policy makers.

There has been little previous formal study of the extent and nature of alcohol industry involvement in science (McCambridge & Mialon, 2018), partly because alcohol

science is a smaller field than is tobacco research. There have, nonetheless, been deep concerns strongly articulated about industry activities in and around the research community. There has been a series of controversies stretching back approximately 30 years (McCambridge & Mialon, 2018). The ways in which alcohol industry actors use science to influence policy have been more extensively studied (McCambridge *et al.*, 2018), as have the activities of industry organizations that refer to themselves as social aspects organizations (SAOs; Babor, 2009; Mialon & McCambridge, 2018).

The scientific consensus that has been well established for more than four decades is that the most effective ways to reduce alcohol harms are by increasing price and reducing availability (Babor *et al.*, 2010). Such measures reduce drinking in the general population, which in turn reduces a wide range of harms to health and society closely related to population levels of drinking. This evidence runs contrary to the business interests of the alcohol industry. There is no body of evidence that constitutes a serious scientific critique of the population-level evidence base. As a result, alcohol companies generally try to avoid such evidence and limit attention to it in policymaking while rhetorically being strongly committed to evidence-based policymaking (McCambridge *et al.*, 2018; Stafford *et al.*, 2020). Industry actors focus attention on more targeted measures, or on other interventions that will have little or no effect on overall sales and, thus, population-level consumption (McCambridge *et al.*, 2014a). Across the world, alcohol industry actors, rather than the science, have been more influential with policy makers (for reasons not elaborated on here). Alcohol harms globally are growing and will do so further as the biggest and most powerful companies target low- and middle-income countries for market development (Ferreira-Borges *et al.*, 2017).

SAOs and other industry organizations make strong claims that their own practices, including the information they disseminate to the public, are evidence based. To do so, they employ scientific and medical professionals who occupy somewhat invidious positions but who, for the purposes of this analysis, we assume do their best to make the information available as accurate and useful to the general public as possible.

To do research on the alcohol industry itself is to engage in a controversial and contested field. Alcohol industry actors challenge research findings that do not reflect well on them, sometimes aggressively. For example, a U.K. government-funded evaluation study of a major public-private partnership in public health (the Responsibility Deal) led to the authors being attacked by the Portman Group with a spurious set of claims, including that they had a “track record of campaigning” (Knai *et al.*, 2015). The senior author, Mark Petticrew, is a distinguished scientist, respected internationally for a range of innovative and distinct contributions to public health research, including on the health effects of social interventions, complex interventions, and systematic reviews.

Petticrew and colleagues went on to study the alcohol industry in various ways. This article is concerned with the nature of the controversies that have resulted and asks in what ways some of the actors studied in Petticrew and colleagues’ research contest the claims made about them. By considering this question, we reveal the rhetorical repertoires by which industry actors dispute claims, and we contribute to the evidence base regarding alcohol industry involvement in science.

Method

The authors of this article are, respectively, a sociologist of science, and a public health scientist conducting research on the alcohol industry. This collaboration necessarily accepts that there is a consensus in alcohol and public health research, and that the scientific consensus matters. This situation is interesting to sociologists of science as the hegemonic policy position, supported by powerful corporate actors, runs counter to the scientific consensus. Although the sociology of science has primarily been oriented toward publicly funded research, there is attention also to issues raised by corporate actors (Latour, 2004; Penders *et al.*, 2009). While one of the key lessons of the sociology of science has been that public debates about science need to include perspectives and expertise from outside disciplinary and institutional settings, there must also be consideration of how to address “fringe” science and when to exclude heterodox voices from these debates (Collins & Evans 2002; Collins *et al.*, 2017).

Sociologists of science have long found scientific controversies to be fruitful sites at which to examine the social processes involved in scientific claim-making. Communication scholars have studied the rhetorical processes involved in “manufactured controversies” (Ceccarelli, 2011), and science and technology studies (STS) scholars have similarly understood these as “counterfeit scientific controversies” (Weinel, 2008, 2019). Both of these terms imply active deception or bad faith. This may be true in many cases, such as in the conspiracy to disrupt the accumulation of knowledge on the health harms of tobacco, but fringe actors may dispute consensus positions of mainstream science in the absence of any such intent.

This article examines three “moments of controversy,” each initiated by an article by Petticrew and colleagues.

These are an examination of the information on alcohol and cancer provided by alcohol industry organizations (Petticrew *et al.*, 2018a), an analysis of the Twitter activity of social aspects organizations (Maani Hessari *et al.*, 2019a), and a comparison of the scientific claims and advice regarding pregnancy and fertility offered by alcohol industry organizations and public health organizations (Lim *et al.*, 2019). These studies were highly critical of alcohol industry organizations, including describing the ways in which they manufacture doubt, and prompted responses from SAOs that were published in the scientific journals concerned. Unlike rebuttal by press release, this dispute was firmly sited in a scientific space.

We took these articles ($n = 3$), the industry responses ($n = 8$), and the subsequent replies by the original authors ($n = 4$) as the material for this study. As researchers from different research traditions, we collaborated to conduct an analysis of claim making at work in this set of documents, using methods informed by the sociology of scientific controversies and mindful of the sensitivities involved. The analysis began with the first author, who was not immersed in the scientific literature in question, identifying the series of claims and counterclaims before the second author applied his reading of the debates, informed by his knowledge of their scientific contents and contexts—that is, his “contributory expertise” (Collins & Evans, 2002). We refined this analysis iteratively and continued until we were satisfied that we had developed a fair and rigorous description of the rhetorical repertoires at work. As described above, we are conscious of our own positioning in relation to the material analyzed, particularly the second author’s work in this area. Readers are also encouraged to directly access the material from the three episodes analyzed to appraise the authors’ interpretations.

Results

Controversy 1 (cancer)

Petticrew *et al.* (2018a) analyzed the information on alcohol and cancer provided by 26 alcohol industry organizations, including major companies, trade associations, and SAOs. This prompted published responses in Drug and Alcohol Review from 4 of the 26 organizations surveyed: Éduc'alcool (Canada), Drinkaware (U.K.), the Portman Group (U.K.), and the International Alliance for Responsible Drinking (IARD), all SAOs.

The Petticrew (2018a) article summarizes, and is careful not to overstate, the scientific consensus. For example, rather than identifying alcohol as a cause of cancer, they cite reviews to describe alcohol as “a well-established risk factor.” The researchers find evidence that alcohol industry organizations misrepresent this consensus using three key strategies: denial/omission, distortion, and distraction. If these claims stand up, this is an example of the “manufacture of doubt.”

The four SAOs adopt similar approaches in their responses. Although the response from Drinkaware states an intention to challenge the validity of the study findings, the others restrict their attention to narrow claims about their own content. None properly address Petticrew *et al.*'s (2018a) findings on the way this content in context works to mislead readers. The Drinkaware response differs in several ways. As a “commentary,” it includes an abstract, with eight of the nine authors affiliated with universities or hospitals. By contrast, the other responses are brief letters authored by one or two individuals.

The Portman Group response (Timothy, 2018) argues that Petticrew *et al.* considered “a technical response [...] [that] was never intended to be a consumer-facing document” (p. 310), without elaborating any implications. It also states that the Petticrew article “makes a number of incorrect assertions” (p. 310) and focuses on addressing four statements. There is an implicit critique of sampling, although no effort is made here to address technical implications, for example, consistency with other data sources. Instead, the study findings are dismissed as assertions.

The Éduc'alcool response (Nadeau & Sacy, 2018) claims that Petticrew *et al.* made “six erroneous statements” (p. 307), and a central plank of their reply is that the document considered by Petticrew *et al.* was published in 2005, before the IARC added breast cancer and colorectal cancer to the list of alcohol-associated cancers in 2007. Nadeau & Sacy present a paragraph from the Éduc'alcool website, saying “This is precisely what we have been accused of hiding” (p. 307).

The IARD (Martinic, 2018) accuse Petticrew *et al.* of presenting a “distorted picture” and “welcome the opportunity to correct the record” (p. 308). It is ironic that the IARD claim a statement has been taken out of context, prompting a concession that none of the other responses make. They write: “the sentence could be misinterpreted by a lay person if viewed out of context. IARD will amend it to ensure that it cannot be misinterpreted” (p. 308). Aside from this, there is a refusal to engage with the arguments made by Petticrew *et al.*

The Drinkaware response (Larsen *et al.*, 2018) suggests that Petticrew *et al.* are undermining public health by making “unjustified allegations of inaccuracy and by unwarranted attacks on its independence and integrity” (p. 304). This response largely ignores Petticrew *et al.*'s attention to context and audience. For example, Drinkaware's discussion of the risk factors other than alcohol for breast cancer is defended by saying

that there is “overwhelming evidence of their correctness” (p. 305), and had they not included such a section, Drinkaware would be “guilty of precisely the crimes of omission of which Petticrew *et al.* accuse other bodies” (p. 305).

Drinkaware’s strongly worded defense of their independence may be a response to Petticrew and colleagues’ specific guidance to public health bodies, academics, and practitioners: “Despite their undoubtedly good intentions, we suggest that it is unethical for them to lend their expertise and legitimacy to industry campaigns which mislead the public about alcohol-related harms” (p. 301).

None of the responses address the breadth of industry organizations analyzed in the original article or the similarities between the information provided by social aspects organizations and that produced by major companies and trade associations.

A reply by Petticrew *et al.* (2018b) rebuts an accusation from Drinkaware that the analysis is unprofessional. Because the responses have not addressed issues to do with context and framing, there is a restatement in the reply by Petticrew *et al.* of the basic findings regarding the ways in which the information analyzed is misleading. Petticrew *et al.* welcome what they regard as minor corrections and state that “the findings and contribution of this research remain unchanged.”

Controversy 2 (Twitter)

In 2019, the same research group (with overlapping author teams) published a comparative analysis of the 2016 Twitter activity of three alcohol industry-funded SAOs (Drinkaware [U.K.], Drinkaware.ie [Ireland], and DrinkWise [Australia]) and three charities not funded by the alcohol industry in those countries (Alcohol Concern [U.K.], Alcohol Action Ireland, and FARE [Australia]) in the *International Journal of Environmental Research and Public Health* (Maani Hessari *et al.*, 2019a). This article refers to the earlier article on misleading information on cancer in setting up a series of a priori hypothesis tests in which the basic inferential structure is that any differences between the two types of organizations suggest that the SAOs lack independence. Coding procedures and content analysis methods for text and images on Twitter are described.

Maani Hessari *et al.* (2019a) found that “AI-funded bodies were significantly less likely to tweet about alcohol marketing, advertising and sponsorship; issues related to alcohol pricing, including MUP [minimum unit pricing]; physical health harms, including cancers, heart disease, dementia and diabetes; and fertility and pregnancy. They were less likely to tweet about anger/aggression as a consequence of drinking too much; and about the impact of alcohol on emergency services” (p. 5). By comparison, “Alcohol industry-funded bodies were significantly more likely to tweet about drinking too much, cutting down, children and underage drinking, teens/parents, staying safe while drinking, alcohol units and guidelines, calories/obesity, and alcohol-free or low alcohol drinks. They are also more likely to tweet about drink driving” (p. 6). Drinkaware is identified with Twitter activity that was most dissimilar to the non-industry-funded organizations.

Maani Hessari *et al.* (2019a) interpret these differences to be “consistent with previous evidence that the purpose of such bodies is the protection of the alcohol industry’s reputation” (p. 8). The problem with the word purpose is that it invites questions of impropriety and deception. The authors may be on much firmer ground had they interpreted their evidence in terms of the function, content, or effects of alcohol industry corporate social responsibility (CSR) organizations. The authors acknowledge that their study is unable to access the intentions behind the content.

Of the three industry-funded organizations studied, only Drinkaware responded (Sim *et al.* 2019). Drinkaware.ie (Ireland) and DrinkWise (Australia), which were also included in the earlier “cancer” study, did not respond. The response comes from the Independent Medical Advisory Panel and does not list the other affiliations of the panel members. They allege that the study objectives are “intended to undermine the charity’s independence and value,” saying that it is “at best inaccurate, and in reality highly misleading” to call Drinkaware an “alcohol industry CSR organisation” and not an “alcohol educational charity.” They take specific issue with the passage discussing “purpose,” stating in relation to the organization “we are confident that there is no such purpose.” They suggest that this is “not based on any factual evidence, but on the beliefs of the authors.” They do not discuss the evidence from other studies cited or the scientific substance of the article itself. This response focuses on attacking Maani Hessari and colleagues as scientists and looks to be largely an exercise in reputational damage limitation. For SAOs, being seen to produce biased information or act in industry interests undermines their *raison d’être*. The panel make much of their formal independence (acknowledging funding in a conflict-of-interest statement, unlike previously), without addressing the data that call the independence of their content into question.

This reply references the Drinkaware response to Petticrew *et al.* (2018a), stating that Maani Hessari *et al.* fail “to acknowledge published rejection of many of the unsupported assertions in that article” (Sim *et al.*, 2019, p. 1). In other words, Larsen *et al.* (2018) is used as a resource by which to challenge future research on the activity of SAOs. The normative attack on the scientific practices of Petticrew and colleagues is extended to the journal; “we wondered if perhaps the journal had encountered difficulty in identifying external reviewers who might have been alert to possible bias?”, before claiming that a reviewer should “have spotted that the only ‘validation’ of the authors’ assertions, is to their own previous paper.” Unlike their response to the “cancer” article, which addresses the specific claims made about Drinkaware, in this case neither the data, the methods, nor argument of the article are examined, merely dismissed as “unwarranted assertions that do not stand up to scientific scrutiny” (p. 1).

Maani Hessari *et al.* (2019b) address the question of purpose in their reply. They point to a body of literature that supports the claim that SAO organizations “are funded by the industry as part of efforts to avoid regulation and to protect sales [. . .] The panel may believe that Drinkaware’s activities contribute to improving people’s health. However, their belief does not reflect the evidence—an evidence base which peer-reviewed research, such as the current paper, as well as previous papers, contributes to” (p. 2). Maani Hessari *et al.* (2019b) themselves make normative claims of what it is to do good science, writing that the Drinkaware response betrays “an unusual understanding of the scientific process, apparently suggesting that a peer-reviewed publication based on systematic data collection and analysis is merely ‘assertion’, whereas their letter to the editor, is ‘evidence’” (p. 2).

Controversy 3 (pregnancy and fertility)

Later in 2019, Lim *et al.* published a study in this journal comparing the scientific claims and advice offered on the effects of alcohol on pregnancy (and fertility) by the websites of alcohol industry organizations and SAOs with equivalent web pages produced by public health organizations. The design of this study combined aspects of the previous two, surveying a similar range of organizations to the first study with the comparative dimension of the second study. This study also located the alcohol industry data within

the wider context of what is known about other industries. The Portman Group was not included, but there were responses from the three other respondents to the first article, which again restrict their comments to narrow claims about the content for which their organization is responsible.

Lim *et al.* (2019) found that alcohol industry-related websites emphasized uncertainty and ambiguity with regard to the science, identifying passages making it appear that the science was confused, that there was a serious debate between scientists, or that the issues were unsettled. For example, the DrinkWise page states that there is “confusion about how much one can safely drink during pregnancy” (p. 257). Passages such as these present the “controversy” as being open, and are a feature of the manufacture of doubt (Oreskes & Conway, 2011) and attempts to maintain a “counterfeit scientific controversy” (Weinel, 2019).

The IARD response from a senior scientific staffer (Tujague, 2020) argues that Lim *et al.*’s “assertions” were “misleading.” As previously, the approach taken is to correct specific information without addressing findings on framing and rhetorical impact. Indeed, as to “purpose,” Tujague specifically calls out Lim *et al.* for offering no evidence on intent, which Lim *et al.* had identified as a study limitation.

The response from Drinkaware, again from the medical advisory panel (Sim *et al.*, 2020), grounds its rebuttal in the “reasonableness” of their efforts at getting the information correct. This is set in contrast to the authors, who are described as being in “ideological opposition to any kind of engagement with ‘industry’” (p. 388). Sim *et al.* invite “constructive engagement with other informed third parties” and “challenge any right-minded person to check Drinkaware’s web content” (p. 388). Again, they ignore questions of framing, stating that, “Drinkaware links to some of the very sources of information quoted as reliable at the start of Lim *et al.*’s article” (p. 388).

Sim *et al.* (2020) also moralize their criticism of Lim *et al.* They say that “the public deserve to know about the possibility of a multifactorial etiology to breast cancer. To suggest that only women who drink alcohol get breast cancer is to cast an unwarranted and damaging slur upon those women unfortunate enough to develop breast cancer, whether or not they consume alcohol” (p. 388). Lim *et al.* (2019) do not make any such claims. This extends the rhetorical strategies used by Drinkaware against the credibility of the authors; from unprofessional, to unscientific, and now as moral transgressors. The Drinkaware content is also noteworthy in that it contains an incorrect and far from trivial claim about itself, that it was “established by the U.K. Government in 2006.” The Drinkaware website was created by the Portman Group, which in 2006 signed a memorandum of understanding with U.K. Government agencies that it should be spun off as a separate, independent charity (McCambridge *et al.*, 2014b).

Éduc’alcool’s response from their Director General (Sacy, 2020) rests on narrow claims about content. Sacy suggests that the Éduc’alcool information is fundamentally the same as that provided by the Public Health Agency of Canada, without engaging with questions of context or framing. Sacy emphasizes the credentials and institutional affiliations of Éduc’alcool collaborators, reminds the reader of the earlier dispute, and implies that Petticrew and colleagues are unscientific: “As any true scientist understands, science is an ever-evolving web of knowledge that is consistently being updated, based on new results and discoveries. It is perplexing that the authors managed to criticize a statement that reflects the truth” (p. 384). They go on to suggest: “the biased approach

used by Lim *et al.* (2019) makes it difficult for reputable and scientifically rigorous organizations to take into account their criticism” (p. 385).

The authors of the Lim *et al.* article wrote two responses to these criticisms (Petticrew *et al.*, 2020a, 2020b). Responding to Éduc’alcool’s claims about science and the reference to scientific credentials, they write, “It is a basic scientific principle that contentions must be based on evidence [...] rather than arguing from authority like this” (Petticrew *et al.*, 2020b, p. 386), and reiterate what is known about alcohol industry organizations within the wider scientific literature. Responding to IARD and Drinkaware, they repeat points made in the previous disputes: “Both organizations point to accurate information on their websites as evidence that their information overall is accurate. This is neither logical nor relevant to our analysis. We have nowhere claimed that all the information on their website is inaccurate” (Petticrew *et al.*, 2020a, p. 393). This sums up the scientific substance of the SAO interventions; making narrow claims about accuracy while ignoring substantial engagement with the issues of framing, context, and impacts on readers.

Discussion

The responses by SAOs raise narrow questions of content accuracy, rather than engaging with the overall findings of the articles, and make normative claims about good science. When Delbourne (2011) writes that “Scientists, their allies, and opponents engage in struggles not just over what is true, but who may validate, access, and engage contentious knowledge” (p. 67), it reminds us that these struggles are not only about “being correct.” Researchers might reasonably expect that any future studies of SAOs will involve work fending off counter claims by the actors studied. This back- and-forth in the peer-reviewed literature produces “moments of controversy,” three of which we have examined. We argue that these controversies are scientific in location only, being published in peer-reviewed journals.

The arguments made by Petticrew and colleagues are largely not contested; rather, specific details are addressed out of context. This is ironic, given that their argument is that the context in which a claim is made can cultivate doubt and uncertainty. Alleged deficiencies in information are used not to interrogate the validity of the claims made but as a platform for wholesale rejection and condemnation of the scientists. There are no attempts to understand the findings in relation to the limitations of the methods used or literature on which they build. While defending their reputations, the SAOs frame the articles as bad science, with Drinkaware also explicitly attacking the editorial and review processes that led to the papers being published.

Although these moments of controversy—part of a larger discussion regarding the purposes and functions of industry-funded organizations that relate to science (Babor & Robaina, 2013)—are found in a scientific forum, the object of dispute slips from the substantive findings to the legitimacy of studying the social aspects organizations themselves. The forum is important. These replies become scientific artefacts, legitimated by publication in the scientific literature, a resource to be used in subsequent disputes as we see in the later responses of both Drinkaware and Éduc’alcool. In the future, it will be possible to write, “previous papers by Petticrew and colleagues have been heavily criticized,” attaching several references to add credibility to such claims, just as Sim *et al.* (2019) use Larsen *et al.* (2018). It is key to remember here that whereas the audience for a genuine scientific controversy includes other scientists in the field, the audiences for a

counterfeit scientific controversy are people outside the field (e.g., the public, policy makers, journalists). These audiences cannot be expected to possess the tacit knowledge, obtained by socialization in the research community, that would allow them to discriminate between sources and to identify genuine disputes between scientists.

The scientific content of these exchanges matters little when their existence can be mobilized to support the credibility of the claims of SAOs. Others have shown that corporate actors publish in the scientific literature to build their credibility as serious participants in the scientific conversation (Penders & Nelis, 2011; Sismondo, 2009). In this case, a body of citable “inscriptions” (after Latour & Woolgar, 1986) are created that have potential to circulate in perpetuity in an economy of claim and credibility, disrupting knowledge claims about the function of SAOs. This study shows that alcohol science is not well equipped to handle the appropriation of its essentially trust-based processes.

We argue that this kind of dispute is irreconcilable, as it is not possible for SAOs to recognize the validity of claims that pose such an existential threat. The SAO interventions are thus highly defensive, designed to protect the reputations of the organizations. The replies, printed in peer-reviewed journals, thus operate as public relations exercises given legitimacy by being located within the scientific literature, without making any contribution other than an occasional correction (which instead could be published as such).

It is appropriate for journals to consider why they publish this kind of content, which adds to the burden of doing work in this area, manufacturing doubt about (and distracting attention from) important scientific issues, in part by facilitating attacks on published research and researchers. These organizations can write what they like on their websites, but why should journals publish such harmful material? Gate-keeping is an essential part of doing good science. Editorial judgment will be a better arbiter than blanket prohibitions, although decision-making also must take account of the potentially conflicting interests of journals in attracting readers to content. Discussions among editors of addiction journals may help build understanding of the consequences of publication decisions such as have been studied here and inform the emergence of norms within the scientific community. Further research is needed on the ways in which alcohol industry actors make scientific interventions by funding research, disseminating findings to the general public, and publishing in journals and elsewhere, not least because the extent of involvement in the peer-reviewed literature appears much more extensive than has previously been appreciated (Golder *et al.*, 2020).

References

- Babor, T., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham, K., and Rossow, I. (2010). *Alcohol: No ordinary commodity: Research and public policy (2nd ed.)*. Oxford, England: Oxford University Press.
- Babor, T. F. (2009). Alcohol research and the alcoholic beverage industry: Issues, concerns and conflicts of interest. *Addiction*, 104, Supplement 1, 34–47. doi:10.1111/j.1360-0443.2008.02433.x
- Babor, T. F., & Robaina, K. (2013). Public health, academic medicine, and the alcohol industry's corporate social responsibility activities. *American Journal of Public Health*, 103, 206–214. doi:10.2105/ AJP.2012.300847

- Ceccarelli, L. (2011). Manufactured scientific controversy: Science, rhetoric, and public debate. *Rhetoric & Public Affairs*, 14, 195–228. doi:10.1353/rap.2010.0222
- Collins, H., Bartlett, A., & Reyes-Galindo, L. (2017). Demarcating fringe science for policy. *Perspectives on Science*, 25, 411–438. doi:10.1162/POSC_a_00248
- Collins, H., & Evans, R. (2002). The third wave of science studies: Studies of expertise and experience. *Social Studies of Science*, 32, 235–296. doi:10.1177/0306312702032002003
- Delborne, J. A. (2011). Constructing audiences in scientific controversy. *Social Epistemology*, 25, 67–95. doi:10.1080/02691728.2010.534565
- Ferreira-Borges, C., Parry, C. D., & Babor, T. F. (2017). Harmful use of alcohol: A shadow over sub-Saharan Africa in need of workable solutions. *International Journal of Environmental Research and Public Health*, 14, 346. doi:10.3390/ijerph14040346
- Golder, S., Garry, J., & McCambridge, J. (2020). Declared funding and authorship by alcohol industry actors in the scientific literature: A bibliometric study. *European Journal of Public Health*, 30, 1193–1200. doi:10.1093/eurpub/ckaa172
- Knai, C., Petticrew, M., Mays, N., Durand, M. A., & Eastmure, E. (2015). Knai and colleagues' response to comments of the Portman Group in news story about their research on the "responsibility deal" on alcohol. *BMJ*, 350, h2063. doi:10.1136/bmj.h2063
- Larsen, J., Wallace, P., Sim, F., Chick, J., Jarvis, S., Lidington, I., and Owens, L. (2018). Accuracy of alcohol and breast cancer risk information on Drinkaware's website. *Drug and Alcohol Review*, 37, 304–306. doi:10.1111/dar.12676
- Latour, B. (2004). Why has critique run out of steam? From matters of fact to matters of concern. *Critical Inquiry*, 30, 225–248. doi:10.1086/421123
- Latour, B., & Woolgar, S. (1986). *Laboratory life: The construction of scientific facts*. Princeton, NJ: Princeton University Press.
- Lim, A. W. Y., Van Schalkwyk, M. C. I., Maani Hessari, N., & Petticrew, M. P. (2019). Pregnancy, fertility, breastfeeding, and alcohol consumption: An analysis of framing and completeness of information disseminated by alcohol industry-funded organizations. *Journal of Studies on Alcohol and Drugs*, 80, 524–533. doi:10.15288/jsad.2019.80.524
- Maani Hessari, N., van Schalkwyk, M. C. I., Thomas, S., & Petticrew, M. (2019a). Alcohol industry CSR organisations: What can their Twitter activity tell us about their independence and their priorities? A comparative analysis. *International Journal of Environmental Research and Public Health*, 16, 892. doi:10.3390/ijerph16050892
- Maani Hessari, N., van Schalkwyk, M. C. I., Thomas, S., & Petticrew, M. (2019b). Reply to Comment on Maani Hessari, N.; van Schalkwyk, M.C.; Thomas, S.; Petticrew, M. Alcohol industry CSR organisations: What can their Twitter activity tell us about their independence and their priorities? A comparative analysis. *International Journal of Environmental Research and Public Health*, 16, 2576. doi:10.3390/ijerph16142576
- Martinic, M. (2018). The International Alliance for Responsible Drinking's response to Petticrew *et al.*: 'How alcohol industry organisations mislead the public about alcohol and cancer'. *Drug and Alcohol Review*, 37, 308–309. doi:10.1111/dar.12674
- McCambridge, J., Kypri, K., Drummond, C., & Strang, J. (2014a). Alcohol harm reduction: Corporate capture of a key concept. *PLoS Medicine*, 11, e1001767. doi:10.1371/journal.pmed.1001767

- McCambridge, J., Kypri, K., Miller, P., Hawkins, B., & Hastings, G. (2014b). Be aware of Drinkaware. *Addiction*, 109, 519–524. doi:10.1111/add.12356
- McCambridge, J., & Mialon, M. (2018). Alcohol industry involvement in science: A systematic review of the perspectives of the alcohol research community. *Drug and Alcohol Review*, 37, 565–579. doi:10.1111/dar.12826
- McCambridge, J., Mialon, M., & Hawkins, B. (2018). Alcohol industry involvement in policymaking: A systematic review. *Addiction*, 113, 1571–1584. doi:10.1111/add.14216
- Mialon, M., & McCambridge, J. (2018). Alcohol industry corporate social responsibility initiatives and harmful drinking: A systematic review. *European Journal of Public Health*, 28, 664–673. doi:10.1093/eurpub/cky065
- Nadeau, L., & Sacy, H. (2018). Éduc'alcool response to Petticrew *et al.*: 'How alcohol industry organisations mislead the public about alcohol and cancer'. *Drug and Alcohol Review*, 37, 307. doi:10.1111/dar.12675
- Oreskes, N., & Conway, E. M. (2011). *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. New York, NY: Bloomsbury Publishing USA.
- Penders, B., & Nelis, A. P. (2011). Credibility engineering in the food industry: Linking science, regulation, and marketing in a corporate context. *Science in Context*, 24, 487–515. doi:10.1017/S0269889711000202
- Penders, B., Verbakel, J. M. A., & Nelis, A. (2009). The social study of corporate science: A research manifesto. *Bulletin of Science, Technology & Society*, 29, 439–446. doi:10.1177/0270467609349047
- Petticrew, M. P., Lim, A. W. Y., van Schalkwyk, M. C. I., & Maani Hessari, N. (2020a). Alcohol industry corporate social responsibility, strategic ambiguity, and the limits of fact-checking: Response to Drinkaware UK and International Alliance for Responsible Drinking regarding our study of misinformation on alcohol consumption and pregnancy. *Journal of Studies on Alcohol and Drugs*, 81, 392–394. doi:10.15288/jsad.2020.81.392
- Petticrew, M. P., Lim, A. W. Y., van Schalkwyk, M. C. I., & Maani Hessari, N. (2020b). Éduc'alcool and the web of misinformation about alcohol and health. *Journal of Studies on Alcohol and Drugs*, 81, 386–387. doi:10.15288/jsad.2020.81.386
- Petticrew, M., Maani Hessari, N., Knai, C., & Weiderpass, E. (2018a). How alcohol industry organisations mislead the public about alcohol and cancer. *Drug and Alcohol Review*, 37, 293–303. doi:10.1111/dar.12596
- Petticrew, M., Maani Hessari, N., Knai, C., & Weiderpass, E. (2018b). The strategies of alcohol industry SAPROs: Inaccurate information, misleading language and the use of confounders to downplay and misrepresent the risk of cancer. *Drug and Alcohol Review*, 37, 313–315. doi:10.1111/dar.12677
- Sacy, H. (2020) Another example of misleading practices and erroneous information: Éduc'alcool response to Lim *et al.* (2019): "Pregnancy, fertility, breastfeeding, and alcohol consumption: An analysis of framing and completeness of information disseminated by alcohol industry-funded organizations." *Journal of Studies on Alcohol and Drugs*, 81, 384–385. doi:10.15288/jsad.2020.81.384

- Sim, F., Chick, J., Neidle, S., Ogden, G., Jarvis, S., Lidington, I., & Leslie, H. (2019). Comment on Maani Hessari, N.; van Schalkwyk, M.C.; Tomas, S.; Petticrew, M. Alcohol industry CSR organisations: What can their Twitter activity tell us about their independence and their priorities? A comparative analysis. *International Journal of Environmental Research and Public Health*, 16, 2421. doi:10.3390/ijerph16132421
- Sim, F., Chick, J., Neidle, S., Ogden, G. R., Jarvis, S., Lidington, I., & Leslie, H. (2020). A rebuttal to Lim et al.'s (2020) Examination of Drinkaware's presentation of pregnancy, fertility, breastfeeding, and alcohol consumption information. *Journal of Studies on Alcohol and Drugs*, 81, 388–389. doi:10.15288/jsad.2020.81.388
- Sismondo, S. (2009). Ghosts in the machine: Publication planning in the medical sciences. *Social Studies of Science*, 39, 171–198. doi:10.1177/0306312708101047
- Stafford, J., Kypri, K., & Pettigrew, S. (2020). Industry actor use of research evidence: Critical analysis of Australian alcohol policy submissions. *Journal of Studies on Alcohol and Drugs*, 81, 710–718. doi:10.15288/jsad.2020.81.710
- Timothy, J. (2018). Portman Group response to Petticrew et al.: 'How alcohol industry organisations mislead the public about alcohol and cancer'. *Drug and Alcohol Review*, 37, 310–312. doi:10.1111/dar.12673
- Tujague, J. (2020). IARD Responds to Lim et al.'s (2019) Analysis of framing and completeness of information disseminated by alcohol industry-funded organizations. *Journal of Studies on Alcohol and Drugs*, 81, 390–391. doi:10.15288/jsad.2020.81.390
- Weinel, M. (2008). Counterfeit scientific controversies in science policy contexts. Cardiff School of Social Sciences Working Paper No. 120. Cardiff, Wales: Cardiff University.
- Weinel, M. (2019). Recognizing counterfeit scientific controversies in science policy contexts: A criteria-based approach. In D. S. Caudill, S. N. Conley, M. E. Gorman, & M. Weinell (Eds.), *The third wave in science and technology studies: Future research directions on expertise and experience* (pp. 53–70). Basingstoke, England: Palgrave Macmillan.

Previously published as: Bartlett, Andrew and Jim McCambridge. "Appropriating the literature-alcohol industry actors' interventions in scientific journals." *Journal of studies on alcohol and drugs* 82, no. 5 (2021): 595-601.

Coffee Exports as Ecological, Social, and Physical Unequal Exchange: A Cross-National Investigation of the Java Trade

by Kelly Austin

Abstract

This study employs an unequal exchange perspective to assess if dependency on coffee exports in less-developed nations significantly impacts rates of deforestation, secondary schooling, and malnutrition, capturing specific dimensions of environmental, social, and physical well-being. OLS regression analyses reveal that dependency on coffee exports is positively associated with deforestation, malnutrition, and low participation in secondary level education in coffee-producing nations, net of other relevant factors. The findings thus demonstrate that specialization in coffee cultivation is likely to produce limited developmental benefits in poor nations.

Introduction

Coffee has been cultivated, harvested, and exported from less-developed regions since at least the 16th century (Paige, 1998; Pendergrast, 2000; Talbot, 2004, 2011). Coffee continues to represent one of the most important commodities on the world market today, earning Third World exporters over \$16 billion US dollars in trade revenues each year (International Coffee Organization, 2011). In fact, coffee follows oil as the second most highly valued primary sector product exported by developing countries (International Coffee Organization, 2011; Talbot, 2004). While coffee's importance on the global market cannot be discounted, it also signifies a unique commodity because it is produced exclusively in poor nations.

Coffee growers reside in less-developed regions of Africa, Latin America, and Southeast Asia, whereas consumption of coffee takes place in Europe, the United States, and increasingly, rapidly developing areas of Asia (Myers and Kent, 2004; Talbot, 2004). The United States continues to import more coffee than any other country, amounting to the consumption of about 9 lbs of coffee per person each year, or two and a half cups of coffee each day for every man, woman, and child (FAO STAT, 2010; Waridel, 2002). The global coffee industry is extremely profitable, earning an estimated \$60 billion annually; but less than 10 percent of those earnings end up in the hands of coffee farmers (Fair Trade International, 2011).

Researchers often examine the harmful effects of export-directed growth using the concept of unequal exchange, which highlights that inequality in the organization of the world economy leads to relatively high levels of primary sector exports from less-developed nations (Hornborg, 2001, 2009). Currently, empirical researchers most often apply the concept of unequal exchange to studies of environmental degradation, such as those which examine the causes of deforestation and biodiversity loss in less-developed

nations (e.g. Jorgenson *et al.*, 2009; Shandra *et al.*, 2009). However, given the labor requirements of many agricultural commodities and the forms of social disorganization that accompany export-led development, it is likely that unequal trade relationships impact dimensions of social and physical well-being as well. Some of these aspects may be particularly relevant to the coffee trade, as this crop has especially immense labor requirements and cannot be consumed for nutritional or food value (e.g. Talbot, 2004).

While a considerable amount of case-study and descriptive research has been dedicated to analysis of the coffee commodity chain (e.g. Ponte, 2002; Talbot, 2004), the current literature is completely devoid of macro-comparative assessments of coffee exports. This article also adds to burgeoning research on unequal exchange by applying a trade-based dependency measure of coffee exports to an environmental, social, and physical well-being outcome. Coffee is arguably the ideal commodity to assess through an unequal exchange framework, and its production likely contributes to inequalities along multiple dimensions of sustainability and development in less-developed nations.

The characteristics of coffee production

Coffee is exclusively a tropical crop, only grown successfully in very warm, humid climates. The ecology of the coffee tree necessitates specific altitude, temperature, and rainfall amounts, where Arabica coffee requires annual temperatures of 17–25° Celsius, 1200–1500 millimeters rainfall per year, and altitudes of 3000–6500 feet; while Robusta coffee requires annual temperatures of 20–26° Celsius, 1500–2000 millimeters rainfall per year, and altitudes under 3000 feet (Institute for Scientific Information on Coffee, 2011; Talbot, 2004). Both Arabica and Robusta varieties of coffee were originally discovered in Africa, but colonial relations spread coffee seeds to every continent, trying to find appropriate ecological niches where it could be grown (Pendergrast, 2000; Rudel, 2005; Talbot, 2004, 2011). The higher altitudes of Latin America, the island nations of Southeast Asia, and West Africa became especially appropriate for Arabica varieties of coffee, which often grow on hillsides. Robusta varieties tend to be grown in the lower altitudes and more open areas of East and sub-Saharan Africa and the Asian mainland nations, such as Vietnam (International Coffee Organization, 2011; Pendergrast, 2000; Rudel, 2005; Talbot, 2004).

Arabica coffee is considered to have a superior taste, and thus is the kind of coffee found in quality US coffee houses, such as Starbucks (e.g. Jaffee, 2007; Talbot, 2004). Arabica coffee trees face more stringent growing conditions, with a preference for mountainous regions (International Coffee Organization, 2011). In comparison, Robusta coffee has a harsher taste and higher caffeine content; it tends to be regarded as lower quality, and is generally grown in lower-lying fields (Talbot, 2004). Arabica production is often more labor-intense than Robusta production, because the coffee cherries must be picked when they are perfectly ripe in order to maximize quality, which requires numerous passes through the same patch of coffee. Partly due to these conditions, Arabica coffee fetches a higher price on the world market relative to the Robusta variety (International Coffee Organization, 2011; Talbot, 2004; Waridel, 2002). In addition, these patterns begin to suggest that the different types of coffee (Robusta versus Arabica) may produce distinct effects on the environment or measures of social and physical well-being.

It takes three to five years to produce harvestable cherries from a coffee tree, and a mature tree crops on average enough cherries per year to yield less than one pound of

roasted coffee (Institute for Scientific Information on Coffee, 2011; Waridel, 2002). Partly because it takes around five years for a coffee tree to bear fruit, coffee production experiences major price fluctuations and intense boom and bust cycles. Supply responds very slowly to price, creating ‘tree crop price cycles’ (Bacon *et al.*, 2008; Talbot, 2004, 2011). When world market prices are high, growers across the globe plant more coffee; but this new coffee will not enter the market for several years. This leads to over-planting, followed by over-supply. Oversupply of green coffee on the market depresses prices for the next several years (Bacon *et al.*, 2008; Ponte, 2002; Talbot, 2011). Not wanting to waste invested capital, growers will initially continue to harvest and cultivate trees as coffee prices fall. Slowly, production does decline as growers eventually stop maintaining their trees or planting new ones as their farms foreclose. At some point, demand once again supersedes supply, and the uneven cycle continues (Talbot, 2004, 2011).

In an attempt to balance demand and supply, coffee has historically been one of the most regulated commodities on the international market. Although other forms of regulation existed previously, a formal contract, the International Coffee Agreement (ICA), was established in 1962 and it included most producing and consuming countries (Fridell, 2007; Ponte, 2002; Talbot, 2004). The ICA regulatory system set a target price or price band for coffee, and allocated export quotas to each producer. In times where the indicator price rose over the set price, quotas were relaxed; when it fell below the set price, quotas were tightened. Although this system successfully raised and stabilized coffee prices in the past, it was abandoned in 1989 due to issues with free-riding, squabbling over quotas, and non-participation by some consuming nations, who bought ‘non-quota’ coffee at steep discounts and re-exported it ICA-member nations (Bacon *et al.*, 2008; Fridell, 2007; Ponte, 2002). Coffee prices crashed immediately in 1989 and remained low throughout the early 2000s. Additionally, the proportion of income going to coffee growers in poor nations declined significantly since the abandonment of the ICA (Ambinakudige, 2009; Bacon *et al.*, 2008; Jaffee, 2007; Ponte, 2002; Talbot, 2004).

Due to the labor requirements necessary to pick the cherries of the coffee tree, and the elevation requirements that lead to heavy planting on hillsides and rough terrain, production is difficult to mechanize and coffee cultivation is largely a small-holder crop (Fair Trade International, 2011; Jaffee, 2007; Talbot, 2004; Waridel, 2002). International agencies estimate that about 25 million farmers in less-developed countries depend directly upon coffee for their livelihoods (Fair Trade International, 2011; International Coffee Organization, 2011). There are more people involved in growing coffee than any another other crop worldwide (Fair Trade International, 2011).

Despite these numbers, the overall balance of power is still shifted to benefit TNCs headquartered in core nations, as the highest valuing-adding phases of the coffee production process—the roasting, packaging, marketing, and selling—are almost exclusively concentrated in high-income nations (Fridell, 2007; Talbot, 2004). In fact, only about 10 cents of every coffee dollar spent by affluent consumers ends up in the hands of the individual coffee growers, even though the entire coffee trade fundamentally depends on the hard work of the cultivators (e.g. Fair Trade International, 2011; Talbot, 2004). Indeed, commodity chain analysis is one of the most popular analytic strategies used in comparative coffee research, as there are such stark inequalities in the effects of participating in the coffee trade across space and actors (e.g. Bacon *et al.*, 2008; Ponte, 2002; Talbot, 2004, 2011; Waridel, 2002).¹ The global commodity chain approach developed within the world-systems framework, as this perspective sees the world-

economy as a social system with a single capitalist division of labor (e.g. Bair, 2009; Gereffi and Korzeniewicz, 1994). The chain conceptualization highlights the interrelated production processes and economic transactions that create a commodity such as coffee, bringing it from cultivation to the point where it is purchased by the consumer. Commodity chain analysis is unique as it draws focus to the global organization of production, processing, and distribution that transcends national boundaries (e.g. Bair, 2009; Gereffi and Korzeniewicz, 1994).² While commodity chain research is powerful in demonstrating the fundamental inequalities associated with organization of coffee production and distribution that spans national boundaries, cross-national analysis is also needed in order to make systematic comparisons in the overall effects of the coffee trade across nations (e.g. Bernstein and Campling, 2006b).

Analyzing the consequences of coffee production is especially relevant as new trends in cultivation could produce increasingly harmful influences on environmental, social, and physical well-being in less-developed nations. In particular, high-yielding coffee seed varieties drastically alter many coffee farming systems, making production especially damaging to the environment (Institute for Scientific Information on Coffee, 2011; Waridel, 2002). Traditionally, farmers plant coffee trees in semi-shade conditions which allow for the preservation of large tracts of forest, or, the trees are planted in mixed cultivation with other fruit trees, beans, or vegetables used for household consumption. But the new high-yielding trees are most productive in full sunlight, and in general, there is a shift to eliminating mixed cultivation in favor of mono-cropping techniques, where as many coffee trees as possible are planted together in order to maximize yields (e.g. Blackman et al., 2008; Gillison et al., 2004; Jaffee, 2007; Waridel, 2002). Case-study and agro-forestry research already links coffee production to heightened rates of deforestation in Brazil (e.g. Simon and Garagorry, 2005), Indonesia (e.g. Gaveau *et al.*, 2009), Cameroon (e.g. Gbetnkom, 2005), and Ghana (e.g. Appiah *et al.*, 2009), among other regions. In addition to spurring increased forest loss, mono-cropping techniques also increase reliance on pesticides and fertilizers, which further threatens biodiversity and ecosystem health (Gillison *et al.*, 2004; Waridel, 2002).

Technology transfers, land tenure policies, and international and national loans used in rural development schemes help to diffuse these methods of production to small-scale cultivators (Gillison *et al.*, 2004; Roberts and Thanos, 2003; Rudel, 2005; Talbot, 2004; Waridel, 2002). Since coffee faces such restrictive growing conditions and is so highly valued on the global market, where coffee cultivation is possible development agencies and core actors heavily promote its production. International development agencies (e.g. World Bank) and national governments continue to see increasing coffee exports as a means to increase economic growth and development, largely by improving 'unproductive' rural communities (Roberts and Thanos, 2003; Talbot, 2004; World Bank, 2008).

The fact that nations with historically high levels of dependence on coffee cultivation and export experience persistent poverty and remain in dependent positions in the world economy stands in stark contrast to these claims (e.g. Talbot, 2004, 2011).³ Commodity chain analysis clearly demonstrates that core-based TNCs reap the majority of coffee profits through their control of the top of the coffee commodity chain; the most resource and labor intense phases of the production process are exclusively located in less-developed regions (Bacon *et al.*, 2008; Talbot, 2004). Besides persistent poverty, coffee production is likely to have other adverse impacts on the social and physical welfare of growers. Many scholars point out that coffee is a unique agricultural

commodity because it is not an essential food item; it does not sufficiently add to a person's caloric intake or provide adequate energy or nutritional requirements necessary to survival (e.g. Talbot, 2004; Waridel, 2002).⁴ Because coffee cannot be consumed as a food item, and with the expansion of mono-cropping which displaces mixed cultivation systems that contribute to increased household food production, coffee exports likely contribute to heightening rates of hunger and malnutrition in poor nations. A recent study by Messer and Cohen (2007) implicates certain export crops, including coffee and cotton, as key contributors to elevated rates of conflict and food insecurity in some less-developed regions due to their non-nutritional contribution and extreme price fluctuations that result from long plant maturation cycles.

In addition to hunger, case studies conducted in Mexico and Nigeria link coffee cultivation with lower rates of secondary schooling among rural households (e.g. Gitter and Barham, 2009; Gitter et al., 2010; Jaffee, 2007; Kruger, 2007). This research points to the heightened labor requirements of coffee production, which explain trends of lower school enrollment among high coffee-cultivating communities in comparison to low coffee-cultivating communities (e.g. Jaffee, 2007; Kruger, 2007). Indeed, it is likely that this is particularly relevant in regions that produce the Arabica variety of coffee, which demand that the cherries are picked at the peak of ripeness, greatly increasing the length of time for needed for harvest.

Many researchers hope that some of these detrimental patterns might change with expanding interest in fair trade and organic coffee as a means to help impoverished producers and enhance ecological sustainability (Bacon et al., 2008; Blackman *et al.*, 2007; Fair Trade International, 2011; Fridell, 2007; Jaffee, 2007; Rudel, 2005; Talbot, 2004; Waridel, 2002). In particular, case-study and commodity chain analyses reveal that the organic and fair trade coffee movement benefits rural communities by returning a greater share of coffee proceeds to growers (e.g. Bacon et al., 2008; Jaffee, 2007). In addition, many fair trade producers receive several payments for their coffee that are spread out over time, while conventional producers are only paid once a year when they sell their coffee (Jaffee, 2007). Jaffee's (2007) analysis of the Michiza cooperative in Oaxaca, Mexico finds that the greater economic stability of fair trade producers translates into better housing conditions and increased food security, including more varied diets, in relation to conventional coffee producers. Jaffee (2007) is careful to point out that while fair trade and organic producers do receive higher prices for their coffee than conventional producers, they also face increased production and labor costs, largely because of the requirements of organic certification, which include weeding, pruning, and spreading compost, rather than using chemical inputs.

The fair trade and organic movement has also led to more environmentally friendly practices of cultivation in some areas, as consumers are willing to pay more knowing that their coffee was produced sustainably. Organic production in particular is been linked to increased use of natural shade cover or mixed cultivation to bolster biodiversity, as well as less reliance on chemical pesticide and fertilizers (e.g. Blackman *et al.*, 2007; Jaffee, 2007). Indeed, Rudel (2005) demonstrates that reforestation trends in areas of Central America and Southeast Asia partially result from small-scale farmers engaging in green and fair trade coffee production for affluent markets. Despite these promising findings, Talbot (2004) cautiously points out that although the sustainable coffee movement benefits some growers, the unfair organization of the coffee commodity chain remains largely unaltered. Overall, the market share of fair trade and organic coffee is also very

small, accounting for only around 3% of world coffee trade (Fair Trade International, 2011; Fridell, 2007).⁵

Unequal exchanges in the world-system

Research reveals that patterns in coffee production and consumption closely follow broader lines of international inequality. Within the field of macro-comparative sociology, the concept of unequal exchange has been used to capture systematic inequalities in international trade dynamics, as this phrase draws upon world-systems and dependency theorizing to illuminate asymmetrical political and economic relationships between peripheral or less-developed nations and core or highly developed countries (e.g. Bunker, 1985; Emmanuel, 1972; Hornborg, 2001, 2009; Rice, 2007, 2009). The phrase ‘unequal exchange’ was originally coined by Arghiri Emmanuel (1972), who emphasized that exchange of core products for peripheral products involves transfers in surplus value up the world-system from less-developed nations to more-developed nations, as core nations retain the most profitable production processes for themselves.

In many ways, the concept of unequal exchange lies at the heart of world-systems and dependency analysis, as inequalities in trade are a central mechanism for exploitation upon which the unfair relations between countries is upheld and global economic inequality is reproduced. Indeed, historical emphasis on the global division of labor by theorists such as Wallerstein (1974), Amin (1976) and Frank (1979), serves as a basis for this line of thinking. The global division of labor continues to characterize the organization of international production today, as the lowest-paying, most labor-intense, and environmentally damaging industries largely represent those located in and moving to less-developed nations (e.g. McMichael, 2004).

As an alternative view, comparative advantage perspectives argue that poor, tropical nations have an edge in the global market on agricultural and raw material goods, especially for products like coffee, due in part to their natural climates and characteristics of the labor force, which allow these nations to produce agricultural commodities most efficiently and cheaply (Ricardo, 1817; Smith, 1776). Thus, the export of highly valued primary sector products to foreign nations can spur development and economic growth (e.g. World Bank, 2008). Dependency approaches drawing attention to unequal exchange dynamics partly arose as a reaction to these arguments, highlighting that export-led development in primary sector production can only lead to limited developmental gains, given the differences in profitability between core and periphery production processes outlined above (e.g. Rice, 2009).

Although early thinking on unequal exchange dynamics focused on economic factors, based on Marxian assumptions about surplus value flows from the periphery to the core, more recent assessments emphasize that unequal exchange also entails an ecological dimension (e.g. Hornborg, 2001, 2009; Rice, 2009). The ecological aspect to unequal exchange was spurred by Bunker’s research in the 1980s on the consequences of extractive industries in the Amazon (1985). Bunker built upon prior unequal exchange theorization by arguing that there were also increased environmental and human costs to periphery production processes relative to core production patterns. As peripheral economies become integrated into international systems of exchange, production systems become altered. Changes in technology, markets, transport and production capacity, and power or ownership structures, greatly disrupts the environmental and social conditions of less-developed nations, where the drive to harvest more and more resources often

compromises the local well-being of rural communities (Bunker, 1985; Bunker and Ciccantell, 2005).

Thus, many recent empirical assessments of unequal exchange (e.g. Austin, 2010a, 2010b; Jorgenson, 2006; Jorgenson et al., 2009, 2010; Lawrence, 2009; Shandra *et al.*, 2009) have used Bunker's work to articulate patterns in 'ecological unequal exchange'. These studies highlight that the global organization of production facilitates greater resource degradation in peripheral areas relative to core zones, especially for outcomes related to deforestation and biodiversity loss (e.g. Austin, 2010a, 2010b; Jorgenson *et al.*, 2009, 2010; Shandra *et al.*, 2009).

Coffee represents an exceptional case through which to assess unequal exchange relationships. Not only does this product have clear ecological implications for forests, given the scale and new patterns in cultivation, but it has obvious social and health impacts as well, given its lack of nutritional value, decreasing use of mixed cultivation, and intense labor requirements that are likely to impact dimensions of hunger and schooling specifically. Indeed, the global organization of production can disadvantage periphery nations in economic, ecological, and social realms, and considering processes of unequal exchange more broadly allows for comprehensive notions about how patterns in international trade impact various dimensions of sustainability and development in less-developed nations.

Hypotheses

Review of the existing literature on coffee reveals that heightened dependence on coffee exports can have negative effects on the welfare of the people and environment in producing nations. As coffee is largely sent to more-developed nations, while the negative ecological, social, and physical well-being effects remain concentrated in poor nations, coffee exports can be analyzed through the lens of unequal exchange. (H1) I therefore predict that dependence on coffee exports is associated with increased levels of deforestation, heightened rates of malnutrition, and depressed enrollment in secondary schooling in producing nations, net of other relevant factors.

Emerging case-study and commodity chain research also emphasizes the role of organic and fair trade production in reducing some of the negative social and environmental externalities associated with coffee cultivation in certain regions (e.g. Jaffee, 2007). I will therefore also test the extent to which participation in fair trade and organic organizations influences well-being cross-nationally; (H2) I predict that membership in fair trade and organic organizations reduces deforestation and malnutrition rates, and increases secondary school enrollment in coffee-producing nations.

In addition, it is likely that there are significant differences in some of these relationships across the different types of coffee produced, as Arabica and Robusta coffee varieties differ in terms of labor requirements and some growing characteristics. (H3) I thus predict that there are significant differences in the effects of coffee export dependency across Arabica and Robusta producers on deforestation, malnutrition, and secondary schooling in less-developed nations.

Methods

To test the relationship between coffee export dependence and measures of ecological, social, and physical well-being, I employ OLS (ordinary least squares) regression, as is consistent with current macro-comparative unequal exchange research (e.g. Austin, 2010a, 2010b; Jorgenson, 2006). OLS regression is an appropriate analytic technique as this method allows for clear and rigorous hypothesis testing of direct effect relationships. In analyzing the data, I use the statistical program STATA. This program offers regression analysis, as well as the appropriate diagnostic functions for testing adherence to OLS regression assumptions.⁶

A major weakness of this study is the use of a cross-sectional design; however, reliable and expansive longitudinal data on a variety of indicators used, including deforestation and percent undernourished, are not available. Despite this, the variables are time-ordered, where the independent variables are measured before the dependent variables, to help adhere to assumptions of causality. In particular, in the schooling and hunger analyses, all independent variables are measured for the year 2006, while the dependent variables are measured at 2007, as the effects of coffee exports on hunger and schooling should be immediately evident. In contrast, in the deforestation models, coffee exports are also measured at 2006, but, deforestation is measured using a change score from 1990-2005, as coffee trees take around three to five years to produce harvestable fruit. Thus, coffee exports in 2006 are likely to be linked to deforestation rates in the 1990s, and to a lesser extent, the early 2000s, as this is when the coffee trees were initially planted.⁷ All other independent variables in the deforestation analyses (e.g. GDP per capita) are measured at 1990.

Sample

The samples include all coffee producing nations for which there are available data across all indicators for each set of analyses. There are three sets of analyses based on the three dependent variables under investigation, yielding the creation of three different samples (Deforestation analyses $N = 59$, Hunger analyses $N = 51$, Secondary schooling analyses $N = 61$).⁸ Although some inferences are limited because the samples are not completely consistent across each dependent variable, there is an extremely high degree of overlap, and this technique maximizes the sample size in each investigation.⁹

As coffee production occurs exclusively in nations located in the lower three quartiles of the World Bank Income Classification of Countries, the sample is naturally comprised of less- developed nations.¹⁰ The sample sizes are somewhat limited due to restricted data availability on the dependent variables, as well as the key independent variable, coffee export dependence. Although imputation procedures could have been employed to boost sample size, listwise deletion is preferred as it produces more conservative estimates.¹¹

Dependent variables

Deforestation. The deforestation score represents a percent change score, calculated using FAO estimates of natural forest area from 1990–2005.¹² These data were collected for the Global Forest Resource Assessment (GFRA) and represent point estimates for

natural forest stock measured in thousand square hectares for 1990 and 2005 (FAO STAT, 2010).¹³ The natural forest area measure includes land area that is more than 0.5 hectares which contains trees higher than 5 meters and a canopy cover of more than 10 percent. The forest cover change score is multiplied by -1, thus a positive coefficient in the model indicates that deforestation is taking place, while a negative score indicates that expansion in forest size is occurring.

Secondary school enrollment. This measure represents the total secondary school enrollment, regardless of age, expressed as a percentage of the total secondary school-aged population for the year 2007. Enrollment ratio values can be over 100 percent due to the inclusion of overage and underage students in enrollment statistics (World Bank Database, 2011).

Percent undernourished. The influence of coffee exports on rates of hunger is examined using a measure of percent undernourished for the year 2007. This indicator refers to the proportion of the population with food intake that is continuously below a minimum dietary energy requirement for maintaining a healthy life and carrying out light physical activity (World Bank Database, 2011).

Key independent variables

Coffee export dependence. I measure coffee export dependence as the value of green coffee exports as a percentage of the value of all agricultural exports for the year 2006. Looking at a ratio of exports is a common way for researchers to measure export dependence in the world-systems literature (e.g. Ragin and Bradshaw, 1992; Brady *et al.*, 2007), and looking at the level of coffee exports within the agricultural sector, in particular, helps to set up some crude comparisons, as coffee may have even more pronounced effects on the outcomes under investigation than most other agricultural commodities given the scale and characteristics of coffee production.¹⁴ Measuring coffee export dependence in this way also allows for inclusion of a measure of overall dependence on agricultural exports, which is an important control variable as the findings for coffee export dependence could be spurious to overall dependence on agricultural exports. The fact that the overwhelming majority of green, unprocessed coffee is exported to more affluent nations (FAO STAT, 2010) affirms that this indicator appropriately captures unequal exchange dynamics. Data on coffee exports and total agricultural exports were obtained from the FAO Database (FAO STAT, 2010). Export data are measured in constant 2000 US dollars, and the coffee export dependency measure was log-transformed to reduce the influence of extreme cases and to adhere to the assumptions of the analytic technique.¹⁵

The fair trade and organic movement. Organic and fair trade production may reduce some of the harmful social and ecological effects of coffee cultivation (e.g. Jaffee, 2007). I measure participation in the fair trade and organic movement by creating a count variable that represents the number of fair trade or organic organizations for a given nation for the years 1990 and 2006.¹⁶ The data were collected from the Yearbook of International Associations (Union of International Associations, 1991, 2007). The measure was log-transformed to reduce the influence of extreme observations.¹⁷

Robusta and Arabica coffee. To test for variation across Robusta and Arabica producers, a dummy or binary variable is created.¹⁸ In particular, a dummy variable is created for nations that primarily produce Robusta coffee, where nations that primarily produce the Robusta variety are coded with a 1, and nations that primarily produce Arabica coffee are coded with a 0.¹⁹ Slope-dummy interaction terms are created by

multiplying the coffee export dependence indicator by the dummy variable (Hamilton, 1992).²⁰ Including the main effects of interest (e.g. coffee export dependency and dummy variable for Robusta) and the slope-dummy interaction term (coffee export dependency * Robusta) as predictors tests for heterogeneity of slopes across the two types of producers (Hamilton, 1992). A significant coefficient for any slope-dummy variable in this type of analysis indicates that the slope for Robusta producers differs significantly from Arabica producers (the reference category). For example, a significant positive coefficient for Robusta coffee dependence (the interaction term) on percent undernourished would indicate that the effects of coffee export dependence on hunger are especially pronounced in Robusta-producing nations in relation to Arabica-producing nations.

Control variables

Prior research and theorization illuminates other important factors that contribute to forest loss, hunger, and participation in schooling in less-developed nations. In particular, Gross Domestic Product (GDP) per capita is included in every model as an important control variable.²¹ GDP per capita, or level of economic development, represents one of the most consistent predictors of social, health, and ecological outcomes, as national economic growth is linked to improvement in a wide range of measures, including higher rates of schooling, lowering hunger, and reductions in deforestation (e.g. Brady et al., 2007; Burns et al., 2003; Jorgenson et al., 2010; Schofer and Meyer, 2005). GDP per capita represents the total annual output of a country's economy, in current international dollars, per person, for the years 1990 and 2006 (World Bank, 2011). GDP per capita is the total market value of all final goods and services produced in a country in a given year, equal to total consumer, investment, and government spending, divided by the mid-year population. It is converted into current international dollars using Purchasing Power Parity (PPP) rates.²² This variable was log-transformed to reduce the influence of extreme cases.

A second prominent factor is overall dependency on agricultural exports. I thus include Agricultural Exports as Percent of all Exports, which quantifies the value of agricultural exports as a ratio of the value of all exports for the years 1990 and 2006 (FAO STAT, 2010; World Bank Database, 2011).²³ This variable was log-transformed to reduce the influence of extreme cases. Controlling for agricultural exports allows for more rigorous testing of the proposed hypotheses as many of the nations that have high dependency on coffee exports also specialize in exporting other agricultural commodities. Prior research in general finds that specialization in agriculture tends to be associated with lower rates of schooling and higher levels of deforestation (e.g. Jorgenson et al., 2009, 2010; Rudel, 2005; Schofer and Meyer, 2005). The influence of agricultural exports on hunger is not as clear-cut; agricultural exports indicate a high degree of food production, but not necessarily local food consumption (e.g. Jenkins and Scanlan, 2001). Thus examining the role of coffee exports and agricultural exports may help to illuminate specific patterns in food distribution that influence hunger.

I also include the Population Growth Rate in each analysis, measured as the annual percent change in total population for 1990 or 2006. Population growth is important to consider as high rates of population growth strain public and natural resources and have been linked to increases in hunger and deforestation and decreases in secondary schooling in less-developed nations (e.g. Brady et al., 2007; Burns et al., 2003; Jorgenson

and Burns, 2007; Rudel, 1989). Additionally, the deforestation analyses also test for the influence of rural population growth (e.g. Jorgenson and Burns, 2007); I thus include the Rural Population Growth Rate, measured as the annual percent change in the rural population for 1990 (World Bank Database, 2011).

Participation in education will also be considered for all three sets of analyses. Secondary School Enrollment is included in the deforestation and hunger analyses (for the years 1990 and 2006, respectively). Secondary schooling increases awareness of environmental issues, and also is associated with shifts in the economy into higher value production processes, which decreases forest loss and rates of hunger (e.g. Brady et al., 2007; Jenkins and Scanlan, 2001; Rudel, 1989). Additionally, Primary School Enrollment is included in the models that predict secondary schooling (for the year 2006), as earlier participation in schooling is a key predictor of higher levels of education cross-nationally (e.g. Schofer and Meyer, 2005). The school enrollment indicators are gross enrollment ratios, which capture the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to that level of education (World Bank Database, 2011).

Several of the analyses also include Percent Urban, which is measured as the proportion of a country's total national population that resides in urban areas, for the year 2006 (World Bank Database, 2011). Urbanization is an important component of modernization that is generally linked to improvements in social and physical well-being measures in particular (e.g. Brady et al., 2007), as urban populations tend to have increased access to schooling and other public resources that improve health.

Prior research on deforestation identifies that in addition to the factors outlined above, certain geographical characteristics can greatly influence forest loss. In particular, a measure of Forest Stock is utilized in the deforestation analyses as scarcity or abundance of forests could condition deforestation rates (e.g. Rudel, 1989). Forest stock is measured as the total square hectares of natural forest area for the year 1990 (World Bank Database, 2011). This measure was log-transformed to reduce the influence of extreme cases. Additionally, some studies note that deforestation rates are highest in more tropical regions (e.g. Jorgenson et al., 2009). I therefore include Latitude, where I take the absolute value of average latitude scores for each nation in order to capture distance from tropical zones.

Analyses of hunger also find that warfare contributes to cross-national patterns in malnutrition; warfare can disrupt food production and distribution in poor nations, commonly referred to as the 'military famine' hypothesis (Jenkins and Scanlan, 2001; Scanlan, 2001). In the hunger analyses I therefore include Military Expenditures as a Percent of GDP which includes all current and capital expenditures on the armed forces, including peacekeeping forces; defense ministries and other government agencies engaged in defense projects; paramilitary forces; and military space activities (World Bank Database, 2011). Such expenditures include military and civil personnel, including retirement pensions of military personnel and social services for personnel; operation and maintenance; procurement; military research and development; and military aid (in the military expenditures of the donor country). Food production represents another key factor explaining global patterns in hunger, and current arguments debate issues of food production versus food distribution in explaining global hunger trends (Jenkins and Scanlan, 2001), thus making this an important control along with the agricultural export measures under investigation. I include Cereal Yield per capita for the year 2006, measured as kilograms per hectare of harvested land. This includes wheat, rice, maize,

barley, oats, rye, millet, sorghum, buckwheat, and mixed grains. Production data on cereals relate to crops harvested for dry grain only; cereal crops harvested for hay or harvested green for food, feed, or silage and those used for grazing are excluded.²⁴

Prior research also demonstrates that political characteristics are especially relevant to some of the outcomes under examination, such as secondary schooling and deforestation. Studies find that nations which are more integrated into the world-polity tend to have higher participation in schooling and lower levels of deforestation (e.g. Schofer and Hironaka, 2005; Schofer and Meyer, 2005; Shandra, 2007). Participation in the world-polity is measured with INGO Membership, which captures the total number of INGOs in a country for 2006 or 1990 (UIA, 1991, 2007). This measure was log-transformed to reduce the influence of extreme outliers. Additionally, more democratic nations tend to have higher participation in education (Schofer and Meyer, 2005); the Democracy Index is measured on a scale from -10 to +10, where score of +10 indicates a strongly democratic state; a score of -10 indicates a strongly autocratic state.

Results

Table 1 reports the univariate statistics and correlation matrix for all of the indicators included in the deforestation analyses; Table 2 reports these for the hunger analyses; and Table 3 reports these for the secondary schooling analyses. Multicollinearity is often a concern and limitation when using aggregate-level data with small sample sizes. Overall, Tables 1–3 suggest that many of the indicators utilized are moderately correlated, and that model specification should be undertaken with caution. I thus grouped indicators in theoretically and technically justified ways, where independent variables are added in a step-wise fashion. I also estimate a more saturated model for each outcome, which includes all predictors found to be significant from the prior models.²⁵ This modeling strategy is consistent with how researchers in this tradition address concerns of multicollinearity (e.g. Austin, 2010a, 2010b; Jorgenson et al., 2010; Shandra et al., 2009).²⁶

Table 4 reports the regression results for the deforestation analyses. Along with the key independent variable, dependence on coffee exports, GDP per capita is included in every model as an important control for level of economic development. The results from the deforestation analyses reveal that coffee export dependency is positively associated with deforestation rates in coffee-producing nations, net of other relevant factors. The influence of coffee export dependency on deforestation rates remains strong and consistent across the models, including the saturated model presented in Model 7. In addition to coffee export dependence, the deforestation analyses also reveal that dependence on agricultural exports is highly associated with forest loss rates in less-developed nations. This provides clear evidence that coffee export dependence in particular leads to elevated rates of deforestation, even when controlling for export dependence on other types of agricultural commodities.

In addition to the harmful effects of coffee and agricultural export dependency, the results presented in Table 3 illustrate that close proximity to the equator is strongly associated with higher deforestation rates. The early models also suggest that total population growth and low levels of schooling increase rates of forest loss in less-developed nations, although these indicators did not retain significance in the saturated model. There is also some evidence that level of economic development is negatively associated with deforestation rates, as GDP per capita is a significant predictor of forest

loss in many of the models. Rural population growth and INGO membership were not found to significantly impact deforestation rates in coffee-producing nations, net of the effects of the other included predictors. Specifically considering the role of participation in fair trade and organic organizations, the results presented in Model 5 suggest that participation in fair trade and organic organizations does not alleviate deforestation rates from 1990–2005. In considering the possibility of differences across Robusta producers and Arabica producers, Model 6 illustrates that while Robusta producing nations tend to have higher rates of forest loss than Arabica producers (the reference category), these two types of producers do not have significantly different slopes for the effects of coffee export dependence on deforestation rates.²⁷

Turning attention to the analyses of hunger, results presented in Table 5 illustrate that coffee export dependency greatly contributes to rates of undernourishment in coffee-producing nations. Specifically, the results reveal that coffee export dependency is positively associated with percent undernourished, net of the effects of other factors known to contribute to hunger in less-developed nations. In addition to the influence of coffee exports, the results demonstrate that military expenditures and secondary school enrollment represent strong and consistent predictors of hunger in the models, where warfare increases hunger and schooling reduces it. The less saturated models also suggest that population growth positively influences rates hunger, while economic development, urbanization, agricultural exports, and cereal yields lower rates of hunger. These latter findings with regards to agricultural exports and cereal yields further demonstrate that coffee exports are substantively different than other forms of agricultural production in terms of their effects on food security in poor nations.

In considering the predictions regarding fair trade and organic organizations, the analyses of hunger reveal that participation in the fair trade and organic movement is associated with lower rates of undernourishment in coffee-producing nations, net of other relevant factors. This finding confirms prior case-studies which find that the added economic benefits to this type of production are most immediately used for enhancing household food security (e.g. Jaffee, 2007). Additionally, organic growers tend to use more mixed cultivation techniques in the absence of chemical inputs to reduce soil degradation, potentially signaling another avenue by which participation in this type of production reduces hunger in coffee-producing nations. Model 5 of the hunger analyses also includes predictors which test for differences in the effects of coffee export dependence across Robusta versus Arabica producers; both the dummy indicator for Robusta and the interaction term are not significant in predicting rates of undernourishment in coffee-producing nations.²⁸

Table 6 presents the results for the OLS regression analyses predicting participation in secondary schooling. Consistent with the prior analyses, coffee export dependence is demonstrated to have significant influences on schooling in coffee-producing nations. In particular, coffee export dependence is negatively associated with participation in secondary schooling, net of the effects of other important factors. The results also illustrate that GDP per capita, primary school enrollment, percent urban, INGO membership, and democracy represent prominent factors which promote secondary school enrollment in coffee-producing nations, while population growth reduces secondary school enrollment. The first model also suggests that agricultural export dependency reduces participation in secondary schooling, but this finding did not hold in the saturated model (Model 7).

Inclusion of the fair trade/organic organizations predictor in the secondary schooling analyses in Model 4 does not yield significant results, suggesting that membership in organizations specifically dedicated to fair trade or organic production does not benefit schooling rates cross-nationally. The results of the schooling analyses also suggest that the effects of coffee export dependence on secondary schooling rates do not differ significantly across Robusta and Arabica producers; however, the main effect for Robusta demonstrates that Robusta producing nations in general experience lower participation in secondary education in comparison to Arabica producer nations.²⁹

Discussion

Taken together, the results presented in Tables 4, 5, and 6 illustrate that coffee export dependence among less-developed nations is associated with heightened rates of deforestation and undernourishment, and depressed enrollment in secondary level education, net of the effects of other relevant predictors. This set of findings confirms the first hypothesis; coffee export dependence decreases components of environmental, social, and physical well-being in coffee-producing nations. The harmful effects of coffee export dependency were remarkably consistent and robust across the analyses, especially in the models predicting hunger and secondary schooling. The fact that coffee export dependency produced strong effects, net of the influence of overall agricultural export dependency, further suggests that coffee export dependence produces unique and especially harmful to patterns in deforestation, hunger, and schooling in poor nations in comparison to other forms of agricultural production.

While the first hypothesis is ultimately supported, the results only provide partial support for the second set of hypotheses concerning the role of fair trade and organic organizations. Participation in fair trade and organic organizations does not seem to impact rates of schooling or deforestation, but this movement is significant in reducing rates of undernourishment in coffee-producing nations. This study thus provides cross-national evidence that participation in fair trade and organic organizations does bring some important benefits to producers; it is likely that the enhanced incomes of fair trade growers translates most directly into improved household food security, as the case-studies suggest (e.g. Jaffee, 2007). These prior examinations also give some explanation to the non-finding for the schooling analyses. Jaffee (2007) points out that organic production is often more labor intense; perhaps the labor demands of organic coffee are an obstacle in enhancing participation in schooling in producing nations. The fact that fair trade/organic membership did not impact rates of deforestation is somewhat surprising given the favorable case-study evidence (e.g. Blackman et al., 2007; Rudel, 2005); this non-finding should be interpreted with caution, however, as a methodological weakness concerning the early time points for the independent variables in the deforestation models could be a factor, as the number of fair trade and organic producers was very low in 1990. The organic and fair trade movement has become more prominent over the years (e.g. Jaffee, 2007), and is most likely to be influencing current or more recent deforestation rates, as compared to rates in the 1990s.

The results also failed to garner support for the third set of hypotheses concerning differences in the effects of production across Robusta and Arabica producers. Although the main effect for Robusta production was significant in some models, the slope-dummy interaction term was not significant in any of the analyses, suggesting that the influence of Robusta versus Arabica export dependence on deforestation, hunger, and schooling are

not considerably different from one another. Even though there may be some important differences in the specific characteristics of Robusta and Arabica production, these differences do not seem to be great enough to alter how coffee export dependence influences the specific dimensions of environmental, social, and physical well-being examined here.³⁰ What appears to be more significant is the pronounced effects of coffee export dependence in general; reliance on coffee exports stands out as being unique from trade dependence on other agricultural commodities, given its especially notable effects on multiple dimensions of well-being in less-developed nations.

In addition to the harmful effects of coffee export dependency, many factors related to modernization and development, such as GDP per capita, schooling, urbanization, and population growth represent important factors which contribute to rates of deforestation, hunger, and secondary schooling in coffee-producing nations. Military famine arguments were also relevant in explaining patterns in hunger, and the beneficial effects of agricultural exports and cereal yields in some of the hunger models further suggests that coffee exports are distinctive in furthering food insecurity, while other forms of agricultural specialization may abate it. It is important to note that the non-economic developmental controls often produced larger effects on the outcomes of interest than GDP per capita. When combined with the persistently harmful consequences of dependence on coffee exports, these findings confirm broader arguments which suggest that a near-exclusive focus on economic growth and trade integration is not likely to foster successful development in poor nations (e.g. Amin, 1976; Bunker, 1985).

Conclusion

Coffee represents an affluent global commodity that is produced and traded on a larger scale than any other agricultural product, where there is over 10 million hectares of land in the developing world dedicated to coffee cultivation (International Coffee Organization, 2011). While a substantial amount of case-study and descriptive research explores the structure and inequalities of the coffee commodity chain, this study fills an important gap by analyzing coffee exports in a cross-national, empirical context, where the consequences of production are considered as forms of unequal exchange. As coffee exports represent up to 80 percent of foreign exchange earnings in some nations (International Coffee Organization, 2011; Waridel, 2002), examining the effects of the java trade warrants careful scrutiny.

Theorization on unequal exchange is embedded in world-systems and dependency perspectives, where the global division of labor concentrates low-wage, low-skill, and labor-intensive forms of production in poor nations. In this way, export-orientated development is likely to undermine elements of economic, ecological, and social sustainability. Indeed, a major contribution of this research includes extending the concept of unequal exchange to dimensions of sustainability or development that go beyond ecological and economic outcomes. A nuanced look at coffee in particular illuminates that unequal exchange relationships can operate at the level of specific commodity types, and that certain global commodities may be especially influential in reproducing conditions of underdevelopment.

The principal limitations of this study concern sample size, temporal scope, and measurement of some variables. Small sample sizes are attributed to limited data availability on the key predictors, as well as the dependent variables. As previously mentioned, many of the variables of interest are not available at multiple points in time,

making longitudinal assessments unfeasible. Additionally, necessary temporal ordering for the deforestation models (where all other independent variables besides coffee export dependence are measured at 1990) could be a factor contributing to non-significance for some of the independent variables, including the fair trade/organic predictor. The measurement of Robusta and Arabica exports using a slope-dummy interaction is also somewhat crude, perhaps contributing to non-significant findings for the interaction terms. While raw export values by coffee type would be more appropriate in testing for differences across the types of coffee production, this data is not available for a wide number of cases or for past time points. The International Coffee Organization is beginning to provide more detailed coffee statistics for current years, so hopefully in the future this can be a direction for further research. Although limitations such as these are common in cross-national analyses, using available information to make systematic comparisons can provide valuable insights and helps to illuminate structural patterns across nations.

Coffee is regarded as the most important of the tropical commodities (e.g. Talbot, 2004), as it is the largest revenue source for poor nations among all agricultural products (FAO STAT, 2008; Waridel, 2002). Thus many less-developed nations' economies fundamentally depend on coffee income, and in recent decades this has been a devastating situation as coffee prices have been extremely low. However, coffee prices are increasing in the most recent years (International Coffee Organization, 2011), which makes monitoring the effects of coffee exports on developmental outcomes extremely important, as better coffee prices could lead to increased emphasis on promoting coffee cultivation in poor nations.

While there may be some limited economic gains for coffee producers, the results presented here suggest that integration into foreign coffee markets re-organizes production processes in less-developed nations, where unequal exchanges in the world-system compromise successful development across multiple realms. Many poor nations have a comparative advantage for producing coffee; however, specializing in coffee exports can impair important dimensions of environmental, social, and physical well-being, which in the end limits prospects for future development. Indeed, schooling and physical health are two dimensions of human capital that are especially important to the modernization and advancement of societies. While coffee is a profitable product for core-based TNCs, growers in poor nations receive few benefits (e.g. Talbot, 2004). Dependence on coffee production in rural communities undermines ecological, social, and human resources that are intrinsic to successful development, thus reproducing patterns of underdevelopment in poor nations.

Notes

1. In addition to the global commodity chain framework, there has been a rise of a second commodity approach, called the global value chains approach. The global value chain approach can be distinguished by its greater influence of the international business literature in analyzing global production networks (e.g. Daviron and Ponte, 2005).

2. Some critiques of global commodity chain and global value chain approaches include: an overall lack of systematic analysis; neglect of fully considering the structures of class inequality within nations or the 'nationality' of capital; questions about whether these analyses are truly 'global' in scope (see for example, Bernstein and Campling, 2006a, 2006b).

3. Although some producing nations have historically profited from coffee production, namely Brazil, Colombia, Costa Rica, and Cote d'Ivoire, at certain time points (most notably in the 1970s before the crash of the ICA), nations that are most dependent on coffee exports, such as many sub-Saharan African nations, are marked by persistent poverty and growers continue to realize only a very small proportion of coffee profits (e.g. Talbot, 2004). This is especially relevant in the most recent decades of very low green coffee bean prices (International Coffee Organization, 2011).

4. Although some other agricultural items share this characteristic, such as tea and cocoa, coffee is undeniably the most prominent small-holder crop across less-developed regions and new trends in mono-cropping are likely to reduce mixed cultivation with edible crops; thus coffee's effects on food security are likely to be most substantial and relevant.

5. Indeed while many argue that this movement is informed by dependency perspectives, the efforts made by Fridell (2007) demonstrate that these strategies rely on trade reform and state intervention to overcome unequal structures of the world-economy. Fridell's analysis (2007) further highlights that fair trade and other certification systems are symptomatic of the shift from public to private regulation under neoliberalism.

6. One key assumption of OLS regression requires that all variables are normally distributed. Skewness statistics revealed that many of the variables, including the key independent variable, were highly skewed; thus many of the indicators were log-transformed to address this concern. Results from the Breusch-Pagan and Modified White's tests reveal no problems with heteroskedasticity, thus conventional standard errors are used.

7. Models were also tested where deforestation is measured from 1990 to 2000; the substantive results were consistent with those presented here.

8. The deforestation analyses include the following nations in the sample (N = 59): Angola, Belize, Benin, Bolivia, Botswana, Brazil, Burundi, Cambodia, Cameroon, Central African Republic, China, Colombia, Comoros, Congo Rep, Costa Rica, Cuba, Dominican Republic, Dominica, Ecuador, El Salvador, Ethiopia, Fiji, Ghana, Guatemala, Guyana, India, Indonesia, Jamaica, Kenya, Lao People's Democratic Republic, Madagascar, Malawi, Mauritius, Mexico, Nepal, Nicaragua, Niger, Nigeria, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Samoa, Senegal, South Africa, Sri Lanka, Suriname, Swaziland, Tanzania, Thailand, Togo, Tonga, Uganda, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

The hunger analyses include the following nations in the sample (N = 51): Angola, Belize, Benin, Bolivia, Botswana, Brazil, Burundi, Cambodia, Cameroon, China, Colombia, Congo Rep, Cuba, Dominican Republic, Ecuador, El Salvador, Ethiopia, Fiji, Gambia, Ghana, Guatemala, India, Indonesia, Jamaica, Kenya, Lao People's Democratic Republic, Madagascar, Malawi, Mauritius, Mexico, Mozambique, Nepal, Nicaragua, Nigeria, Papua New Guinea, Peru, Philippines, Rwanda, Senegal, Sierra Leone, South Africa, Sri Lanka, Sudan, Swaziland, Tanzania, Thailand, Uganda, Uruguay, Vietnam, Zambia, Zimbabwe.

The schooling analyses include the following nations in the sample (N = 61): Angola, Belize, Benin, Bolivia, Botswana, Brazil, Burundi, Cambodia, Cameroon, Central African Republic, China, Colombia, Comoros, Congo Rep, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Ethiopia, Fiji, Gambia, Ghana, Guatemala, Guyana, India, Indonesia, Kenya, Lao People's Democratic Republic, Madagascar, Malawi, Mauritius, Mexico, Mozambique, Nepal, Nicaragua, Niger, Nigeria, Panama, Papua New Guinea, Peru, Philippines, Rwanda, Samoa, Senegal, Sierra Leone, South Africa, Sri Lanka, Sudan, Suriname, Swaziland, Tanzania, Thailand, Togo, Tonga, Uganda, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

9. I also tested a uniform sample across all three dependent variables, and the substantive results were consistent. I choose to present the results for the non-uniform samples here, as I prefer to use as much information (data) as possible when reporting models and drawing conclusions.

10. This is consistent with how prior researchers define less-developed nations. See for example, Austin (2010a, 2010b); Brady *et al.* (2007); Jorgenson *et al.* (2009, 2010); Shandra *et al.* (2009).

11. Listwise deletion is considered a more ‘conservative’ method for dealing with missing data as decreased sample size may inflate the standard error estimates.

12. For the following nations, data on natural forest stocks were not available, so a deforestation rate based on total forest estimates was used in order to bolster sample size: Botswana, Burundi, Costa Rica, Dominica, Ecuador, Guyana, Mexico, and Venezuela.

13. The natural deforestation rate reflects the annual percent change in natural forest cover, which does not include forest plantations or areas used for forestry and other related purposes, only native vegetation.

14. I also measure coffee export dependence as a percentage of agricultural exports to avoid confounding with overall dependence on agricultural exports, which is measured as the value of agricultural exports as the percentage of all exports. Because the denominators are different across these two trade measures, it avoids including redundant independent variables in the same model. Indeed, the bivariate correlation matrices depict only a weak correlation between coffee export dependence within the agricultural sector and overall agricultural export dependence; this further confirms that including both of these variables in a model does not bias the results.

15. I also tested models using coffee exports as a percentage of all exports, and the substantive results were consistent. However, the need to also control for overall dependence on agricultural exports necessitates that dependence on coffee exports be measured as a percent of agricultural exports.

16. It is appropriate to combine organic and fair trade organizations as most fair trade cooperatives also practice organic practices (e.g. Jaffee, 2007). Fair trade and organic organizations were identified by examining the names and mission of the INGOs to assess commitment to fair trade or organic issues. As export data on fair trade and organic coffee is not available for a wide number of nations, this represents one of the best ways to capture participation in this type of production in cross-national analysis.

17. I also tried weighting the number of fair trade/organic organizations by the population size; this did not alter the substantive results.

18. A dummy-variable is at this time the only way to measure differences across the types of coffee in cross- national analysis as annual export data broken down by Robusta and Arabica varieties for a wide number of nations is not publically available (e.g. FAO STAT, 2010; International Coffee Organization, 2011).

19. This measure is based on information from the International Coffee Organization (2011), which classifies producing nations as either Robusta producers, Arabica producers, or Mixed producers. For mixed producers, the volumes of coffee production by type are reported, and nations were classified as Robusta or Arabica based on the production estimates. I also tried categories for Robusta, Arabica, and Mixed producers; the substantive results are consistent with those presented here.

20. More specifically, a slope-dummy variable is a type of interaction term created by multiplying a continuous measurement variable (e.g. x_1 = coffee exports) by a dichotomous dummy variable (e.g. x_2 = Robusta), which creates a new variable (e.g. coffee exports * Robusta = x_1x_2). The newly constructed variable x_1x_2 has the values of x_1 for all cases for which the dummy variable (i.e. x_2) is coded as '1', and a '0' for all the remaining cases (see Austin, 2010a, 2010b; Burns *et al.*, 2003; Hamilton, 1992). This approach is somewhat different than those most common in social scientific studies that generally construct interaction terms between two categorical and/or discrete variables (e.g. gender and ethnicity).

21. This represents an especially important control variable given that the labor requirements and other characteristics of coffee mean that coffee cultivation is also going to be attracted to poorer nations. There indeed are likely to be some recursive processes, as poverty likely leads to coffee production, and coffee production also leads to more poverty (e.g. Talbot, 2004). The focus of the current study however concerns the latter, principally in the context of how coffee exports influence non-economic indicators of poverty or underdevelopment (namely, deforestation, hunger, and low participation in secondary schooling). In order to adhere to requirements of causality and confirm that coffee exports influence the outcomes under investigation in light of the fact that agricultural production is also drawn to impoverished nations, I include several of the most important control variables, such as overall dependency on agricultural exports, GDP per capita, population growth, and schooling, in each analysis, in addition to relevant predictors that are specific to the outcome under investigation. This careful attention to possible spurious factors reduces the influence of effects that might arise from the fact that economic poverty may also lead to increased coffee export dependency. Surely, the extent to which poverty may further increase coffee exports deserves more attention in cross-national research.

22. Many macro-sociologists argue that PPP estimates of GDP are more appropriate than dollars estimates based on exchange rates, as PPP rates provide a standard measure allowing comparisons of real price levels between countries.

23. In its current form, this measure also includes coffee exports in the numerator. I also constructed this indicator subtracting out coffee exports, and the substantive results were consistent. I prefer to measure dependency on agricultural exports with coffee included, as this provides even stronger evidence that dependency on coffee within the agricultural sector influences the outcomes of interest, net of the effects of dependency on agricultural exports in general.

24. I also tried many other measures of food production, but cereal yield produced the most consistent and robust effects on percent undernourished, and thus is the measure presented here. It is likely that cereal yield is one of the most prominent predictors of hunger as many cereals are used for local consumption. This measure clearly excludes cocoa, tea, and other 'food' products that would not be consumed locally or that lack nutritional value. Cereals can also usually be stored for a significant amount of time without spoiling.

25. Most standards suggest that multicollinearity does not significantly bias the results when VIFs do not exceed 10, and most conservative thresholds argue that VIFs should be below 2.5 (e.g. Tabachnick and Fidell, 2001).

26. In any quantitative, cross-national study of this sort, there is a potential problem of multicollinearity. Kennedy (2001) suggests a test for multicollinearity in which each independent variable is regressed on all other independent variables. It is common not to worry about collinearity unless the R-squares from these equations exceed the R-squares in the original analysis (Kennedy, 2001; Rudel, 1989). This procedure was used for the present analyses, and the

results did not suggest issues of multicollinearity. Nonetheless, the models were constructed with caution and with careful attention to the VIFs and patterns in significance.

27. Elsewhere I include measures of urbanization, democratization, GDP generated by agriculture, urban population change, deforestation data quality indicators, and coffee consumption as additional controls on deforestation. The effects of these predictors on deforestation were non-significant, and/or their inclusion did not substantively alter the reported findings.

28. Elsewhere I include measures of democratization, rural population change, urban population change, INGO membership, food production index, and coffee consumption as additional predictors of percent undernourished. The effects of all the additional predictors on percent undernourished were non-significant, and their inclusions do not substantively alter the reported findings.

29. Elsewhere I include measures of gross capital formation, public expenditures on education, the teacher to pupil ratio, rural population change, urban population change, and coffee consumption as additional predictors. The effects of all the additional predictors on secondary school enrollment were non-significant, and/or their inclusions do not substantively alter the reported findings.

30. Some of this may also be due to limitations of the data, as a dummy variable was used to estimate Robusta versus Arabica production. Although export data by coffee type would be ideal, these data do not exist for a sizeable number of nations. The International Coffee Organization does have some export and production data by coffee type, but this is only available for a small handful of nations. Hopefully as more nuanced estimates continue to be collected this line of research can be further developed.

References

- Ambinakudige S (2009) The global coffee crisis and Indian farmers: The livelihood vulnerability of small- holders. *Canadian Journal of Development Studies* 28(3): 553–566.
- Amin S (1976) *Unequal Development: An Essay on the Social Formations of Peripheral Capitalism*. New York: Monthly Review Press.
- Appiah M, Blay D, Damnyag L, Dwomoh FK, Pappinen A and Luukkanen O (2009) Dependence on forest resources and tropical deforestation in Ghana. *Environment, Development and Sustainability* 11(3): 471–487.
- Austin K (2010a) The ‘Hamburger connection’ as ecologically unequal exchange: A cross-national investigation of beef exports and deforestation in less-developed countries. *Rural Sociology* 75(2): 270–299.
- Austin KF (2010b) Soybean exports and deforestation from a world-systems perspective: A cross-national investigation of comparative disadvantage. *The Sociological Quarterly* 51(4): 511–536.
- Bacon CM, Mendez VE, Gliessman SR, Goodman D and Fox JA (2008) *Confronting the Coffee Crisis: Fair Trade, Sustainable Livelihoods, and Ecosystems in Mexico and Central America*. Cambridge, MA: MIT Press.

- Bair J (2009) *Frontiers of Commodity Chain Research*. San Francisco, CA: Stanford University Press.
- Bernstein H and Campling L (2006a) Commodity studies and commodity fetishism I: Trading down. *Journal of Agrarian Change* 6(2): 239–264.
- Bernstein H and Campling L (2006b) Commodity studies and commodity fetishism II: Profits with principles. *Journal of Agrarian Change* 6(3): 414–447.
- Blackman A, Avalos-Sartorio B and Chow J (2007) Shade coffee and tree cover loss: Lessons from El Salvador. *Environment* 49(7): 22–32.
- Brady D, Kaya Y and Beckfield J (2007) Reassessing the effect of economic growth on well-being in less-developed countries, 1980–2003. *Studies in Comparative International Development* 42: 1–35.
- Bunker S (1985) *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State*. Urbana: University of Illinois Press.
- Bunker SG and Ciccantell PS (2005) *Globalization and the Race for Resources*. Baltimore, MD: Johns Hopkins University Press.
- Burns TJ, Kick EL and Davis BL (2003) Theorizing and rethinking linkages between the natural environment and the modern world-system: Deforestation in the late 20th century. *Journal of World-Systems Research* 9(2): 357–390.
- Daviron B and Ponte S (2005) *The Coffee Paradox: Global Markets, Commodity Trade and the Elusive Promise of Development*. London: Zed Books.
- Emmanuel A (1972) *Unequal Exchange*. New York: Monthly Review Press.
- Fair Trade International (2011) Coffee. Available at: <http://www.fairtrade.net/coffee.0.html>.
- FAO STAT (2010) Food and Agriculture Organization Statistical Database. Available at: <http://faostat.fao.org/>.
- Frank AG (1979) *Dependent Accumulation and Underdevelopment*. New York: Monthly Review Press.
- Fridell G (2007) *Fair Trade Coffee: The Prospects and Pitfalls of Market-Driven Social Justice*. Toronto: University of Toronto Press.
- Gaveau DLA, Linkie M, Suyadi P, Lavang P and Leader-Williams N (2009) Three decades of deforestation in southwest Sumatra: Effects of coffee prices, law enforcement, and rural poverty. *Biological Conservation* 142(4): 597–605.
- Gbetnkom D (2005) Deforestation in Cameroon: Immediate causes and consequences. *Environment and Development Economics* 10(4): 557–572.
- Gereffi G and Korzeniewicz M (1994) *Commodity Chains and Global Capitalism*. Westport, CT: Praeger Publishers.
- Gitter SR and Barham BL (2009) Conditional cash transfers, shocks, and school enrollment in Nicaragua. *The Journal of Development Studies* 45(10): 1747–1767.
- Gitter SR, Weber JG, Barham BL, Callenes M and Lewis JM (2010) Fair trade-organic coffee cooperatives, migration, and secondary schooling in southern Mexico. Towson University, Department of Economics, Working Paper Series.
- Gillison AN, Liswanti N, Budidarsono S and Tomich TP (2004) Impact of cropping methods on biodiversity in coffee agroecosystems in Indonesia. *Ecology and Society* 9(2): 7–32.
- Hamilton L (1992) *Regression with Graphics*. Belmont, CA: Duxbury Press.

- Hornborg A (2001) *The Power of the Machine: Global Inequalities of Economy, Technology, and Environment*. Walnut Creek, CA: AltaMira Press.
- Hornborg A (2009) Zero-sum world: Challenges in conceptualizing environmental load displacement and ecologically unequal exchange in the world-system. *International Journal of Comparative Sociology* 50(3): 237–262.
- Institute for Scientific Information on Coffee (2011) Available at: All About Coffee. <http://www.coffeeand-health.org/all-about-coffee/>.
- International Coffee Organization (ICO) (2011) Available at: <http://www.ico.org/>.
- Jaffee D (2007) *Brewing Justice: Fair Trade Coffee, Sustainability, and Survival*. Berkeley: University of California Press.
- Jenkins JC and Scanlan SJ (2001) Food security in less developed countries, 1970 to 1990. *American Sociological Review* 66(5): 718–744.
- Jorgenson A (2006) Unequal ecological exchange and environmental degradation: A theoretical proposition and cross-national study of deforestation, 1990–2000. *Rural Sociology* 71: 685–712.
- Jorgenson A and Burns T (2007) Effects of rural and urban population dynamics and national development on deforestation rates, 1990–2000. *Sociological Inquiry* 77: 460–482.
- Jorgenson A, Austin K and Dick C (2009) Ecologically unequal exchange and the resource consumption/environmental degradation paradox: A panel study of less-developed countries, 1970–2000. *International Journal of Comparative Sociology* 50(3): 263–284.
- Jorgenson A, Austin K and Dick C (2010) The vertical flow of primary sector exports and deforestation in less-developed countries: A test of ecologically unequal exchange theory. *Society and Natural Resources* 23: 888–897.
- Kennedy P (2001) *A Guide to Econometrics*. Cambridge, MA: MIT Press.
- Kruger DI (2007) Coffee production effects on child labor and schooling in rural Brazil. *Journal of Development Economics* 82(4): 448–463.
- Lawrence KS (2009) The thermodynamics of unequal exchange: Energy use, CO2 emissions, and GDP in the world-system, 1975–2005. *International Journal of Comparative Sociology* 50(3–4): 335–359. McMichael P (2004) *Development and Social Change: A Global Perspective*, 3rd edn. Thousand Oaks, CA: Pine Forge Press.
- Messer E and Cohen MJ (2007) Conflict, food insecurity, and globalization. *Food, Culture and Society* 10(2): 297–315.
- Myers N and Kent J (2004) *The New Consumers: The Influence of Affluence on the Environment*. Washington, DC: Island Press.
- Paige JM (1998) *Coffee and Power: Revolution and the Rise of Democracy in Central America*. Cambridge, MA: Harvard University Press.
- Pendergrast M (2000) *Uncommon Grounds: The History of Coffee and How it Transformed the World*. New York: Basic Books.
- Ponte S (2002) The ‘latte revolution’? Regulation, markets, and consumption in the global coffee chain. *World Development* 30(7): 1099–1122.

- Ragin CC and Bradshaw YW (1992) International economic dependence and human misery, 1938-1980: A global perspective. *Sociological Perspectives* 35(2): 217–247.
- Ricardo D (1817) *On the Principles of Political Economy and Taxation*. New York: Cambridge University Press.
- Rice J (2007) Ecological unequal exchange: international trade and uneven utilization of environmental space in the world system. *Social Forces* 85(3): 1369–1392.
- Rice J (2009) The transnational organization of production and uneven environmental degradation and change in the world economy. *International Journal of Comparative Sociology* 50(3–4): 215–236.
- Roberts JT and Thanos ND (2003) *Trouble in Paradise: Globalization and Environmental Crises in Latin America*. New York: Routledge Press.
- Rudel T (1989) Population, development, and tropical deforestation: A cross-national study. *Rural Sociology* 54(3): 327–338.
- Rudel T (2005) *Tropical Forests; Regional Paths to Destruction and Regeneration in the Late 20th Century*. New York: Columbia River Press.
- Schofer E and Hironaka A (2005) The effects of world society on environmental outcomes. *Social Forces* 84: 25–47.
- Schofer E and Meyer J (2005) The worldwide expansion of higher education in the twentieth century. *American Sociological Review* 70: 898–920.
- Scanlan S (2001) Guns, butter, and development: Security and military famine extensions of the modernization versus dependency debate. *Journal of Political and Military Sociology* 29: 331–355.
- Shandra JM (2007) The world polity and deforestation: A cross-national analysis. *International Journal of Comparative Sociology* 48(1): 5–28.
- Shandra JM, Leckband C, McKinney LA and London B (2009) Ecologically unequal exchange, world polity, and biodiversity loss. *International Journal of Comparative Sociology* 50(3–4): 285–310.
- Simon MF and Garagorry FL (2005) The expansion of agriculture in the Brazilian Amazon. *Environmental Conservation* 32(3): 203–212.
- Smith A (1776) *The Wealth of Nations*. New York: Bantam Dell.
- Tabachnick BG and Fidell LS (2001) *Using Multivariate Statistics*. New York: Allyn and Bacon.
- Talbot JM (2004) *Grounds for Agreement: The Political Economy of the Coffee Commodity Chain*. Oxford: Rowman & Littlefield Publishers.
- Talbot JM (2011) The coffee commodity chain in the world-economy: Arrighi's systemic cycles and Braudel's layers of analysis. *Journal of World-Systems Research* 17(1): 58–88.
- Union of International Associations (1991, 2007) *Yearbook of International Associations*. Brussels: K.G. Saur.
- Wallerstein I (1974) *The Modern World-System, Volume I: Capitalist Agriculture and the Origins of the European World-Economy in the 16th Century*. New York: Academic Press.

Waridel L (2002) *Coffee with Pleasure: Just Java and World Trade*. Montreal, Canada: Black Rose Books. World Bank (2008) *World Development Report: Agriculture for Development*. Washington, DC: World Bank. World Bank Database (2011) *World Development Indicators*. Available at: <http://databank.worldbank.org/ddp/home>.

For all Tables and previous publication see: Austin, Kelly. "Coffee exports as ecological, social, and physical unequal exchange: A cross-national investigation of the java trade." *International Journal of Comparative Sociology* 53, no. 3 (2012): 155-180.

<https://journals.sagepub.com/doi/pdf/10.1177/0020715212455350>

5 Socializing Vampires: Meat, Sugar, and Ecology

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The Power of Environmental Vegetarianism

by Carolin Laier

1. Food Matters

“There is nothing more intimate than eating, more symbolic of the connectedness of life, and more mysterious. What we eat and how we eat is by no means an insignificant ethical concern.” - J. Baird Callicott

We need to eat, to survive. Food leads us through the day and through life. It is of remarkable importance for our existence and still so often underestimated. It is a crucial part of our identity, our inner self and the norms and values we have grown up with – or have adapted over time. Eating is intimate. It influences our social structure and connects us to others. Taste is one of the most influential indicators for our individuality and still it is so deeply influenced by others. Eating is complex, mysterious and obscure. It reaches far into our personal and social life.

Today, our way of living and consuming needs change. Climate change not only increases the global average temperature by making winters milder or weather events stronger. It has become an existential crisis that can only be overcome by global, communal action, a degrowing economy and inherent social change. Food matters because it reflects who we are and in what way we connect to our society and its structure, the environment and to nonhuman species. Today, it matters because it has influence on the climate. What and how we eat has never been of such ethical concern. If we want our species to survive this crisis, we have to start by eating plant based.

1.1 The dominant Food System in the Anthropocene

In 2000, geochemist Paul Crutzen declared that the human pressure on to the planet had marked a new geologic period: the Anthropocene. He concluded that the anthropogenic influences of

industrialization, extensive deforestation, urbanization, fossil-fuel consumption, that results in rising greenhouse gas emissions, had led to the transition from Holocene to Anthropocene (Heuretebise, 2017). “Human beings have become the most important driving force in shaping the environment” (ibid, p.17). Whereas the Holocene marks a geologic period of comfort for humanity, the Anthropocene challenges human and nonhuman species well-being globally (McLaren, 2018; Steffen et al., 2011). Climate change has been caused by the extreme increase of greenhouse gas emissions in the atmosphere. It is human induced and responsible for rising temperatures and an increase in extreme weather events worldwide. It further leads to melting ice caps which makes the sea levels rise. It has become the “defining issue of our time” (UN, 2020). McLaren (2018, p.137) argues “that the climate system becomes symbolic of a broken world (Jackson, 2014): seriously disrupted, certainly vulnerable to further drastic change, maybe on the brink of a devastating collapse, and moreover, apparently impossible to perfectly restore”.

Historically, the industrial revolution builds a turning point within the human development. Next to an emerging globalized economy, it has also led to the industrialization of food (Carolan, 2011). The use of technology enabled the possibility for farming on a bigger scale. With the beginning of the 20th century, food manufacturing firms and chain grocery stores appeared (Thompson, 2015). Over time, a complex food system arose that alienates the consumer from the food production. Food production in affluent societies is a highly technologized and industrialized system. Whereas one would assume that the overarching goal should be to nourish the population, the food industry works towards making economic profit. Hence, the aim is to produce as much cheap food as possible (Carolan, 2011; Foer, 2009). In this food system, meat production is of major importance. With growing wealth, the demand for animal products rises in all global societies (Carolan, 2011). This is because meat traditionally portrays material wealth, dominance and power (Adams, 1990; Bohm et al., 2015; Connell, 2005; Fiddes, 1991). Hence, it reinforces hegemonic masculinity and is a powerful symbol of the industrialized world (Connell, 2005). Additionally, urbanization as well as women entering the workforce has shifted the food intake away from home. As those convenience products are more likely to contain meat, the overall consumption rises (Milford et al., 2019). The increasing use of technology in the food industry enables to deliver animal products at low prices. What used to be a luxury product, today is accessible for everyone in affluent societies.

The industrialization of food, however, faces tremendous obstacles. In order to produce cheap food, ecosystems are altered and turned into monocultured landscapes. This enhances large-scale deforestation, soil depletion and biodiversity loss (Carolan, 2011).

To ensure plant growth in those landscapes, great amounts of fertilizers are needed. Their erosion causes water eutrophication (Carolan, 2011; Steffen et al., 2015). Besides, contemporary food production requires the use of large amounts of fresh water and fossil fuels. What is most problematic, however, is the system’s energy inefficiency. Most of what is grown in plant production is used as feed for livestock (Bohm et al., 2015; Carolan, 2011;). Hence, a lot of energy is lost in the process that transforms plants into meat. Furthermore, the greenhouse gases that animals emit while growing have become a major contributor to climate change (Carolan, 2011; EAT, 2019; Rööß et al., 2015). The animals that are raised, are mostly kept in confined places. The goal is to raise as many, as fast as possible. Therefore, their bodies are bred so that productivity is maximized. Their feed serves them to gain weight, although this may mean that it

does not suit their digestive systems. Overall, the animals require a lot of human care and often also medical treatment (Foer, 2009; Novek, 2005; Pascalev, 2006).

Once the cheap food has reached the consumer, other issues occur. Big parts of the global population suffer from hunger, while the cheapness of food products in industrialized societies enhances overconsumption. This fosters overweight, the development of heart diseases and increases food waste (Bohm et al., 2015; Rööß et al., 2015). Generally, the alienation of consumer from production has led to a lack of understanding of the industrialized food system. Only in the 1960s, people began reflecting on its sustainability, especially due to its large environmental impact (Thompson, 2015). Instead of pushing for an inherent change back then, the dominant food system in the Anthropocene is as meat centered as before. It is still environmentally destructive and fosters social inequality. Dauntingly, non-affluent nations currently aim towards similar consumption habits as affluent nations. Scientists, however, concluded that the planet cannot supply a growing world population with industrialized diets (EAT- Lancet, 2019; Steffen et al., 2015).

1.2 The Solution: Eating Plant-Based

The goal for the future is to create a “safe-operating space to maintain a Holocene-like state” (Steffen et al., 2015). In order to be able to achieve that, global warming has to be counteracted and environmental destruction to be eradicated (ibid). The present food system contributes to both – greenhouse gas emissions as well as environmental degradation. Hence, it needs to be subject of “radical transformation” (EAT, 2019). The EAT-Lancet Commission (2019) has published a report that presents a sustainable diet plan. The diet is based on the development of sustainable, less-environmentally destructive farming practices. It suggests a mainly plant-based eating that is accompanied by animal products for nutritional reasons. It moves away from the meat centered diets of industrialized societies. This is for both planetary as well as health aspects. Thereby, the wasteful and destructive food system shall become suitable for a future human society. Rööß et al. (2015) underline the EAT-Lancet Commission’s conclusion. The abolition of an animal-product centered diet enables the reduction of around 50% of greenhouse gas emissions. The researchers included the use of food-industry by-products as feed so that less land is required, and the energy efficiency can be increased.

1.3 The Environmental Vegetarian Movement

The publication of Rachel Carson’s *Silent Spring* in 1962 marked the beginning of an environmental movement that protested among other against the destructive industrialized food system. Frances Moore Lappé supported the movement writing *Diet for a Small Planet* in 1971. For the first time, the author thematized the environmental destruction and social inequality an industrially focused food system leads to. Consumers then, attempted distancing themselves from supporting factory farming by investing in alternative, more regional and natural food production (Thompson, 2015).

During that time, the ethical vegetarian movement began to grow (Hourdequin, 2015). Peter Singer started the Animal Liberation movement (Singer, 1975). Shortly after, Tom Regan proposed animals to be subject of a life and therefore eligible of rights (Regan, 2003). As moral necessity for humanity, ethical vegetarians strongly emphasize the abolition of animal products and factory farming. The goal was to achieve moral standing for animals and nature (Callicott,

1989; Regan, 2003; Singer, 1975). Although, the movement remains one of the strongest reasons to convert to vegetarianism, it has never been convincing on a broad societal level. Today, the percentage of vegetarians in most industrialized countries ranks around 4 to 8% (Ruby, 2011).

Those numbers already include all those, who turn towards plant-based diets for health reasons (ibid). Recently, however, something changed. The growing concern about climate change and environmental destruction in regard to the future of humanity on this planet gave rise to a new movement: The environmental vegetarian movement. A plant-based diet is the logical consequence to lower greenhouse gas emissions on an individual level (EAT, 2019). It is supported by the prominent scientific conclusions discussed above. The activists that are part of the movement, however, do not just aim to lower greenhouse gas emissions. They push for inherent social change. Two of the most prominent examples that have emerged within the past two years are *Fridays for Future* and *Extinction Rebellion*. In the autumn of 2018, the Swedish Greta Thunberg began a school strike for the climate. She demonstrated every Friday in front of the Swedish Parliament in Stockholm (Will, 2019). Her main goal is to push decision makers globally to move away from focusing on economic growth. Instead, they should counteract climate change and global inequality so that future generations are not left behind with hostile living environments. What started as individual activism has become a global movement called *Fridays for Future* that makes millions of young people demonstrate regularly (Will, 2019). Thunberg herself is a convinced environmental vegan.

Extinction Rebellion was also launched in 2018. It seeks to “halt mass extinction and minimize the risk of social collapse” (ER, 2020) through “non-violent civil disobedience” (ibid). Their vision says further: “We rise in the name of truth and withdraw our consent for ecocide, oppression and patriarchy. We rise up for a world where power is shared for regeneration, repair and reconciliation. We rise for love in its ultimate wisdom. Our vision stretches beyond our own lifespan, to a horizon dedicated to future generations and the restoration of our planet’s integrity.” (ER, 2020) Although, the adaption of an environmental vegetarian diet is no requirement to join the movement, it is highly recommended to eat plant-based (ER, 2020). In both movements, vegetarianism – or even veganism – is part of the individual political activism that pushes for the counteraction of climate change and inherent social change. It means more than living scientifically correct. It has become an important part of the new environmental activist identity.

2. This Essay’s Aim

This essay aims to give an understanding what the environmental vegetarian argument is based on and how it is a crucial to strengthen contemporary environmental activism. First, ethical vegetarian theories will be analyzed in order to place the environmental vegetarian argumentation in historical context. By comparing the theories of Peter Singer (1975; 2009), Tom Regan (2003), Aldo Leopold (1992) and J. Baird Callicott (1989; 2018), a possible explanation will be given why the ethical vegetarian movement that those researchers initiated did not succeed. This serves as basis to grasp what makes the environmental vegetarian movement as convincing and popular, today. The argumentation is mainly underlined by the work of the ecofeminist scholars Val Plumwood (1993; 2002) and Carol J. Adams (1990; 2010).

3. Theoretical Roots

The idea to write this essay stems from personal interest. Hence, it is influenced by the author's personal experience and social surrounding. The argumentation arose while studying and reflecting on meat consumption and vegetarianism for a while. It has been underlined through an extensive, explorative literature research. Suitable literature about meat consumption, production and vegetarianism was searched for either in Uppsala University's library or on the database Philosopher's Index.

This chapter gives a brief overview of the theoretical work of Peter Singer, Tom Regan, Aldo Leopold and J. Baird Callicott. The theories within the fields of animal and environmental ethics build the basis for the analysis of ethical vegetarianism. All authors build their theories on a non-anthropocentric worldview. While anthropocentrism sees only the human of moral concern, non-anthropocentric ethics acknowledges the moral relevance of other organisms next to the human (Gjerris et al., 2013). Ecofeminism– especially the work of Carol J. Adams and Val Plumwood –, masculinity studies, environmental virtue ethics and economics build the theoretical extension for conceptualizing the power of environmental vegetarianism.

3.1 Ethical Vegetarianism 3.1.1 Animals as Center of Moral Concern

Peter Singer and the Animal Liberation Movement

In 1975 Peter Singer's book *Animal Liberation* was published. As part of a wider movement, he writes about his love to animals and the goal to end their oppression and exploitation. The human dominion over other species in industrialized societies has been subject of discussion for a very long time. Whereas it is deeply engrained into Christianity and has been supported by famous Greek philosophers such as Aristotle or Plato, it has also been questioned mainly by philosophers throughout the Roman empire. In Singer's view however, humanity has only fairly recently developed schools of thought that led to the recognition of nonhuman species in general. One important thinker in that context is Jeremy Bentham who saw the animal treatment as tyranny rather than legitimate treatment.

When translating the historical ideologies just mentioned to the present, Peter Singer tries to move away from an anthropocentric view of animals that creates a hierarchy between those that have been chosen as companions and those who are domesticated. He sees his work as appeal to basic moral principles which see humans as superior. Often, animal exploitation is justified by judging them to be of lower rationality and a means to a human end. As humans also show various levels of different mental capacities, intelligence only plays a very secondary role due to humans not being entitled to mistreating others based on their cleverness. Therefore, animals should not be exploited either. Much more important than their capabilities to reason rationally, is nonhuman species' sentience and their ability to feel pain and suffer. Thereby, Peter Singer refers to a quote from Jeremy Bentham: "The question is not, Can they *reason*? Nor Can they *talk*? But Can they *suffer*?" (Singer, 1975, p.222). Arguing that most animals in human surrounding suffer because of their captivity or treatment, the acknowledgment of the sentience of nonhuman animals remains the main theme of Singer's theory. Although, this will require large levels of altruism it is also humanities chance to overcome the global human tyranny. Closing his book, he states: "Human beings have the power to continue to oppress other species forever, or until we

make this planet unsuitable for living beings. Will our tyranny continue [...]?” (Singer, 1975, p.273).

Tom Regan and the Animal Rights Advocates

Tom Regan published *The Case for Animal Rights* in 1983. His work has been inspired by Gandhi’s ideas on how human violence on animals – such as killing and eating them – reflects on our treatment of other human beings. Regan describes that Gandhi’s words not only inspired him but changed his mindset completely. When being enlightened, he was demonstrating against the Vietnam War and the human rights violation connected to it. This is why his theory relates to the idea of human rights. If all humans, no matter what mental capacities or cultural background they have, are ought to be granted the right to protect their most valuable goods such as their lives, bodies and liberty by morally limiting the freedom of others, then animals are to have the same (Regan, 2003). He justifies his idea of granting rights to animals by seeing them as subjects-of-a-life. Human beings “cannot be understood apart from the other forms of life from which we have evolved” (Regan, 2003, p.56).

When put into practice, Regan sees his ideas to have far-reaching consequences on human livelihoods. Merely improving animal welfare is no option for him. In order to show real respect for nonhuman species, the goal is to free all animals from human capture. This means that humans are “to stop raising them for their flesh, [...] killing them for their fur, [...] training them to entertain us, [and] [...] using them in scientific research” (Regan, 2003, p.10).

3.1.2 Ecocentrism or Environments as Center of Moral Concern

Aldo Leopold and his Land Ethic

Aldo Leopold is considered one of the first theorists to have written about the intrinsic value of land. He is therefore seen as ecocentric contributor within holistic environmental ethics (Gardiner, 2017). In *A Sand County Almanac*, Leopold wrote down his experiences living on a farm in Wisconsin. The poetic language not only guides the reader through the beauty of nature and wilderness but at the same time creates awareness of the intrinsic value of both. Thereby, he criticizes how humanity has moved away from the ability to perceive such value. He sees the reason for that in human superiority over others and the focus on economic development.

According to his *Land Ethic*, a holistic land community does not function through individualistic moral agents standing alone. It is more of an interconnected and interdependent community where every part pursues its role aligned with the others. The boundaries of such community are to be stretched to also “include soils, waters, plants, and animals or collectively: the land” (Leopold, 1992, p.204). Humans are then no longer conquerors but plain members and citizens with the goal to conserve the land (Leopold, 1992). Conservation means “harmony between man and land” (Leopold, 1992, p.207) and thereby actively disagrees with the notion to value objects barely for their instrumental value. To guide the decision what is considered right or wrong, Leopold (1992, p.224) famously wrote: “A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise”. Although, he acknowledges the role of the economic feasibility in relation to land- use, he asks humanity to understand that land-use cannot only be influenced by economic determinants (Leopold, 1992).

J. Baird Callicott and the Leopoldian Land Ethic

J. Baird Callicott is seen as one of the most influential contemporary advocates of Aldo Leopold's *Land Ethic* and holistic environmental ethicist. Other than in the animal liberation movement, more than just certain chosen individual animals are to be included into conservation ethics (Callicott, 1989). The human global community is then to be extended on to a land community. By developing Leopold's *Land Ethic* further, Callicott creates three scientific cornerstones: Evolutionary biology builds the conceptual link between human and nonhuman species. Ecological theory – ecology as the economics of nature – is the social integration of humans into nature and thereby implies overarching interconnectedness. The Copernican theory describes the earth as small and livable place that can, as of now, not be extended to somewhere else which implies its need for preservation (Callicott, 1989).

Within such conserved land community, energy is the global currency. By eating others along the food chain, every member of the biotic community maintains the energy flow by eventually dying for one another. Every land community member is part of a circle of life and death – no matter if nonhuman or human. By including everything, Callicott criticizes anthropocentric ethical theories. Humans should acknowledge another species' integrity intuitively. As the biota functions as a whole over a long period of time, humanity must act as a conservator rather than a master (ibid). Humanity can benefit from this as “unhealthy ecosystems, in short, will soon engender unhealthy economic systems” (Callicott, 1995, p.351). Therefore, he advises to create large reserves that exclude human economic activities and livelihoods in general to maintain the integrity of biotic communities. In order “to foster a sustainable livelihood for ourselves and for future generations” (Callicott, 1995, p.358), however, he proposes to “inhabit and exploit those ecosystems lying outside nature reserves in ways that do not compromise their health” (ibid, p.358).

In the recent past Callicott acknowledged that the non-human-centered environmental ethics that he and others supported in the past, had little success in conserving the land from environmental destruction – especially biodiversity loss (Callicott, 2018). By now, humans have cultured almost the entire planet. Hence, humans and nature are blurring together which makes the idea of wilderness – as humanly untouched land – obsolete. Furthermore, he writes how a world that is unsuitable for humans is equally as unsuitable for all other species. The planet itself, however, has lived through much more intense times, experiencing more environmental shifts that humanity can oppose on it. Therefore, not the planet is at stake, but humanity's survival is. To counteract such continuing destructive development globally, Callicott advises each individual to pursue individual political action. Everyone “should conceive and experience oneself to be a node or nexus in a skein of internal socio-environmental relationships” (Callicott, 2018). On an institutional level, he advises the creation of a global government running on the Humean theory of moral sentiments as international currency of ethical theory. Most important is then sympathy, beneficence, patriotism, loyalty and love (ibid).

3.2 Environmental Vegetarianism 3.2.1 Ecofeminism

Val Plumwood's Subject/Object Dualism

Val Plumwood got famous for her critical reflection on anthropocentrism. In one of her most famous works *Feminism and the Mastery of Nature* (1993), she discusses how “the western culture has treated the human/nature relation as a dualism and that this explains many of the problematic features of the west's treatment of nature which underlie the environmental crisis, especially the construction of human identity as ‘outside’ nature” (ibid, p.3). Her writing is a

critique of reason and the rationalist philosophy. Firstly, she notices the masculine dominance within environmental philosophy to be problematic “retain[ing] a dualistic dynamic” (ibid, p.2). Secondly, she emphasizes how male dominance has led to the mastery of nature:

“To be defined as ‘nature’ in this context is to be defined as passive, as non-agent and non-subject, as the ‘environment’ or invisible background conditions against which the ‘foreground’ achievements of reason of culture (provided typically by the white, western, male expert or entrepreneur) take place” (ibid, p.4).

The goal is to overcome the dualistic system by realizing “both continuity and difference; this means acknowledging the other neither as alien to and discontinuous from self nor assimilated to or an extension of self” (ibid, p.6). The human is embedded into nature and deeply dependent upon it. Therefore, Plumwood aims to create a democratic and ecological culture.

Carol J. Adam’s Absent Referent and Feminist Vegetarianism

Carol J. Adams is an ecofeminist activist who writes about intersectional oppression and feminist vegetarianism. In *The Sexual Politics of Meat* (1990) she discusses the connections between male dominance and meat eating. In that context she emphasizes the important bond between feminism and vegetarianism. In what she calls the *dominant culture* – the patriarchy of the white, industrialized, male –, animals are equally as objectified and subordinated as women. The meat-eating society turns animals into *absent referents*. The alienation between consumer and animal in industrialized meat production removes the living animals from the idea of meat. This is why they become absent. The violence, cruelty and domination in those systems stays hidden. When the eater is not exposed to the processing of the animal, racism and inequality are mirrored.

Adams highlights how meat reinforces and symbolizes hegemonic masculinity. It is deeply engrained into culture and language. Vegetarianism challenges the patriarchal society due to the active abolition of a meat-eating culture. It is “the revelation of the nothingness of meat, naming the relationships one sees with animals, and finally, rebuking a meat eating and patriarchal world” (ibid, p.18).

3.2.2 Masculinity Studies

Raewyn Connell’s Hegemonic Masculinity

Raewyn Connell is seen as one of the most important contributors to masculinity studies. In *Masculinities* (2005) she discusses the concept of masculinity within cultural and historical context. Masculinity and femininity are seen as gender projects that only vaguely relate to the biological sex of male and female. They are much more connected to societal structures. Gender relations are “the relations among people and groups organized through the reproductive arena, form one of the major structures of all documented societies” (ibid, p.72). Ultimately, the concept of hegemonic masculinity is not the same among all cultures. In the industrialized world, however, it “can be defined as the configuration of gender practice which embodies the currently accepted answer to the problem of the legitimacy of patriarchy which guarantees (or is taken to guarantee) the dominant position of men and the subordination of women” (ibid, p.77).

3.2.3 Environmental Virtue Ethics

Carlo Alvaro's Virtuous Ethical Vegetarianism

In his book *Ethical Veganism, Virtue Ethics and the Great Soul* (2019) Carlo Alvaro points out industrial animal production as one of the most important ethical questions of the present. Using animals as food is explained because humanity lacks the virtues compassion, temperance, fairness and magnanimity. He sees the chance to tackle ethical veganism by using both virtue ethics and feminist ethics approaches. For Alvaro, the human individual that seeks to have a virtuous character uses ethical veganism as natural expression of its great soul. Hence, the human itself has the incentive to protect animals. In contrast to Regan, Singer, Callicott and Leopold he uses a more anthropocentric approach to argue why ethical veganism should be the right diet for humanity. Essentially, only “virtue ethics is the right approach to morality” (ibid, p.52).

3.2.4 Economics

Kate Raworth's "Donut Economics"

Kate Raworth is an economist. In her publications, she criticizes the contemporary, neoliberal, economic system. *Donut Economics* (2017) sets the social goal for the 21st century. Whereas today many people globally cannot fulfill existential needs, others' luxury lifestyles have caused the overshooting of the planetary boundaries. Hence, the aim is to move into the *sweet spot* of her donut. This means that the needs of all are met within the means of the planet (ibid, 2017). In order to achieve that, the economic system needs to change, so that it is in service of life and not benefitting only a few. It needs to “nurture human nature” (ibid, p.94). The economy must reflect the complexity of life “with its spiraling feedback, emerging trends and surprise tipping points” (Raworth, 2017a). The dominant assumption today is that economic growth will eventually enable all to be wealthy – some maybe more others less. Raworth criticizes such trickle-down effect because it widens the gap between rich and poor (ibid). Therefore, an economic system is needed that distributes wealth equally and is regenerative by design. The economic growth paradigm is to be eradicated (Raworth, 2017).

4. Ethical Vegetarianism

In this chapter the theories that build the basis of ethical vegetarianism are analyzed. Whereas Peter Singer (1975; 2009) and Tom Regan (2003) have written a lot about vegetarianism as logical consequence for the welfare of animals, the initial theories of Aldo Leopold (1992) and J. Baird Callicott (1989), only thematize it vaguely. Especially, the ideas of Aldo Leopold are rather subject of interpretation in the vegetarian context. However, the ideologies are still relevant in regard to the interaction of humanity with ecosystems.

By investigating the animal-centered ideologies of Singer and Regan as well as the ecocentric ideologies of Leopold and Callicott the main theme of ethical vegetarianism as well as its obstacles are revealed: The goal is the abolition of commodification. Commodification means the materialization, instrumentalization and objectification of the Other by humanity (Plumwood, 1993). The Other is thereby a collective term that summarizes nonhuman species and ecosystems. Commodification leads to using the Other as resources to human advantage and is based on human-centeredness. Human-centeredness is what Peter Singer (1975) calls speciesism or what other scholars may define as anthropocentrism. It means that humans perceive themselves as the only subjects of moral concern. They are then superior to the Other at all times (Gjerris et al., 2013).

4.1 Animal-centered Vegetarianism or the Animal Liberation Movement and the Animal Rights Advocates

In accordance with Singer's (1975; 2009) and Regan's (2003) theories, commodification – as defined above – is a major threat to farm animals' welfare, agency and rights. The romanticized picture of farming in the broader public's minds, makes people believe that animals are treated in alliance with their usual behavioral preferences. While the bigger parts of society consider animals, to live thriving lives before eventually getting slaughtered and eaten, contemporary farm animals experience a materialized reality. Animals suffer due to living in confined places with little or no daylight. Their fast growing and bred bodies are fed with high energy foods, often not suitable for their digestive systems. Producers have altered their diets to maximize physical growth. Additionally, their bodies disable them to behave according to their usual, such as to reproduce independently. All of this happens to maximize the production and make it more profitable (Foer, 2009; Regan, 2003; Singer, 2009; Winders and Nibert, 2004). Some claim this treatment of animals to be acceptable due to nonhuman species' inferiority to humans. The basic argumentation is the other species' inability to reason or to talk (Bruers, 2015). Contrary to this notion, animal liberationists identify such treatment as not only exploitative but further as cruel and violent (Deckers, 2009; Novek, 2005; Regan, 2003). This is due to an inexistent significant moral difference between humans and others. Humans as well as nonhumans are perceived to be both sentient as well as having right to a life (Regan, 2003; Singer, 1975). The desire for meat is then so big, that society is willing to give in on such performed cruelty although knowing of the animal's life conditions (Novek, 2005).

Animal liberationists and right activists see human speciesism as underlying problem to commodification. Speciesism means thereby to be putting the interests of other members of one's species first, at all times. It connects to the perception that humans see only themselves as subject of moral concern. It enables the subordination of the Other. This understanding can be traced back to the past due to its deep anchoring into Christian values (Singer, 1975). Domesticating animals not only implies imposing human interests onto them but also to gain control over their space and their body. Hence, nonhuman animals become workers that never leave their workplace (Stuart et al., 2013). This not only causes the worst scenarios of exploitation. When breeding their bodies, society turns them into meat producing machines that are highly dependent on human caretaking (Pascalev, 2006). In the present, the demands for human care have been overcome through increased automation of feeding and slaughtering (ibid). While working processes could be simplified through such technologies, the individual animals suffers from neglect due to human alienation. Besides, the production of meat happens distant from those who the animals are killed for. The closest connection human consumers then form with the initial animal is through the meat that eventually is placed on a plate ready to be eaten. The connection to the sentient living being has gone lost in the value chain. "When organisms are treated as if they are machines, an ethical shift takes place, life is seen as having an instrumental rather than intrinsic value" (Shiva, 1997). In order to recreate the awareness for such intrinsic value of the individual animal, a value shift, which places other than solely human projects into center, needs to take place (Auxter, 1999). This means to place value on both human but also nonhuman life and to "act towards others as you would act toward a part of your own self" (Howard Moore, 1999, p.128). "Eating meat [then] disrupts the natural telos of a diversified environment" (Auxter, 1999, p. 184) and the idea of such a humane and caring treatment towards others. It is seen as cruel, violent and inhumane.

The overarching goal is to treat animals with respect, without having to suffer. This can only be achieved if they have moral standing (Deckers, 2009). The logical consequence is then to abolish meat consumption throughout society (Regan, 2003; Schweitzer, 1999; Singer, 1975). Although Singer (1975, 2009) and Regan (2003), have similar ideas on present animal mistreatment, they have different goals in regard to domestication. Regan (2003) only sees a chance to achieve respect if the situation changes with far-reaching impact:

“We will have to stop raising them for their flesh. We will have to stop killing them for their fur. We will have to stop training them to entertain us. We will have to stop using them in scientific research.” (Regan, 2003, p.10)

This means turning human omnivorous diets into vegan diets as only the abolition of animal confinement can overcome the violence that is imposed on nonhuman animals today. Singer (1975, 2009) takes on a less radical approach. For him, domestication can continue in the future but only if society manages to move towards an altruistic system of animal treatment in production. This implies a vegetarian diet when affordable and raising animals not only to generate profits but for the individuals they are. In more recent works, he further acknowledges that there has been improvement on animal welfare measures since he first published *Animal Liberation* in 1975, especially within the European Union (Singer, 2009).

4.2 Ecocentric Vegetarianism or Holistic Environmental Ethics’ Understanding of Food

According to the Leopoldian land ethic, domesticated animals cannot be a subject of emancipation due to them being living artifacts. Agricultural industrialization has led to breeding that makes them docile, tractable, stupid and dependent on human care (Callicott, 1989). The only chance to liberate those animals is therefore, by stopping to raise livestock and decrease the domestic sphere. The most important goal needs to be the abolition of factory farming on all levels – for animals as well as plants. The use of chemicals, machinery and fertilizers violates the organic integrity. It causes biodiversity loss on a large scale, prevents ecosystems from restoring themselves and can therefore not be accepted (Wenz, 1999). Callicott (1989) asks for a shift to a more organic way of living that maintains the idea of respect for other than the human species.

In his earlier work, he does not see vegetarianism as solution to create respect for nonhuman animals. Firstly, it would require a large shift of diets “from omnivore with carnivorous preferences to herbivore” (Callicott, 1989, p.34). The strong meat-eating culture in industrialized societies forbids for such a shift to be realized. Although, it being “energetically more efficient” (ibid), it would secondly lead to an increase of the human population which in return would also increase human demand and therefore consumption on other levels than nutrition.

In alliance with his form of land ethic, however, every form of commodification and materialization is to be avoided. Although the land ethic’s founding father, Aldo Leopold, never wrote about different forms of diet, his support of a wilderness paradigm and traditional way of living leads to the conclusion that he – aligned with Callicott – would have disagreed with a herbivorous human diet that is based on factory farming practices (Leopold, 1992).

Callicott (1989) disagreed with the adaptation of a plant-based diet. Leopold (1992) would have probably also disagreed. Peter Wenz (1999), however, sees such as only chance to maintain the integrity and health of ecosystems. A vegetarian population would thereby avoid an environmental overuse but would maintain a wilderness state instead. Most important is to not disrupt the ecosystem's ability to regenerate and maintain itself. Nature must obtain an intrinsic value that stays independent from the interests of other species, including humanity (ibid).

4.3 Animal-centered and Ecocentric Vegetarianism in Comparison

This comparison will reveal that all theories, although concerning ethical vegetarianism and the treatment of the Other in different contexts, are similar in their identification of the same threats to nonhuman species as well as environments. It is the commodification of anything that is not human (the Other). The goal of all theories is to eradicate such commodification paradigm through a value shift. This value shift will lead to acknowledging the intrinsic value of the Other. Intrinsic value means valuing an entity for its own sake without connecting it to a potential human use (Gjerris et al., 2013).

The main contrast is the theories' different starting points and focuses. Animal-centered vegetarians see the human relation and interaction with the individual animal as their center of interest. Its suffering is to be avoided at all times. Both wild as well as farmed animals become subject-of-a-life. Due to the extended responsibility of humans towards domesticated animals their need for recognition is emphasized (Regan, 2003). They deserve human respect and well-treatment. Ecocentric vegetarians extend morality on to ecosystems as a whole. Each individual, including the human, is only part of the biotic community (Callicott, 1989; Leopold, 1992).

Furthermore, both approaches have very different ideas regarding the feasibility and strictness of a plant-based diet. In animal-centered vegetarianism a vegetarian or even vegan diet is the logical conclusion to the realization that animals suffer from exploitation and cruelty in human care. In ecocentric vegetarianism there is no final conclusion to be found. Vegetarianism would be logical, especially because of its energy efficiency. A growing human population and its demands prevent Callicott (1989), however, from concluding vegetarianism to be of positive impact for the planet. He only changes his opinion later on (Callicott, 2018). Wenz (1999) disagrees, arguing that a plant-based diet would be the only way of preserving the integrity of ecosystems. A major contrast to animal-centered vegetarianism, however, is that farm animals are not perceived as subject of liberation due to their existence as living artifacts. This then implies that their existence does not count as reason for a conversion to vegetarianism.

Although the worldviews have opposing starting points, focuses and ideas regarding an eventually suitable human diet, they show very important common themes. Animal-centered and ecocentric vegetarianism *criticize human superiority over others*, either individual farm animals or ecosystems. From an animal liberationist perspective, the main concern is human speciesism which is based on the idea that only humans can both reason and talk (Singer, 1975; Regan, 2003). Even though, the holistic environmental understanding never argues in the same terms, there is a lot of criticisms phrased towards anthropocentrism which – just like speciesism – places humans in the center of moral concern (Callicott, 1989; Wenz, 1999).

In both approaches such human superiority causes the most daunting and destructive issues in relation to the Other: It has led to the *instrumentalization of nonhuman life* whereby the intrinsic value has been lost (Shiva, 1997). Further on, a food production system has been created that is based on the commodification of nonhuman animals as well as ecosystems. It runs behind

society's back due to its physical alienation from humanity. For nonhuman animals this means physical exploitation, living in confined places and a neglect of care due to growing automatization (Deckers, 2009; Novek, 2005; Pascalev, 2006; Stuart et al., 2013). For ecosystems, it implies a violation of their *telos*, monocultured food production, desertification, biodiversity loss, deforestation and the creation of a domestic sphere that hosts living artifacts (Carolan, 2011; Callicott, 1989; Foer, 2009; Wenz, 1999). The changes represent the disappearing of what can be called wilderness. It is replaced by a cultural landscape created and shaped by humanity.

Due to the issues such industrialized food production causes, animal-centered as well as ecocentric vegetarianism aim for the abolition of factory farming. Hence, animal liberationists want to build vegetarian societies in order to ban the suffering connected to eating meat. Further, the goal is to reconnect with the animal and create a society that is based on altruism. Such altruist society recognizes the intrinsic value of the Other without the need of being of use for humanity.

Holistic environmentalists demand the eradication of industrialized farming as a whole, not only on the level of animal production. The goal is to achieve a more organic lifestyle (Callicott, 1989) where, similar to an altruistic society, there exists respect for more than just for the human species.

4.4 Why Ethical Vegetarianism did not succeed

Ethical vegetarianism not only has a rich history. It is also a very established ideology. It is still considered one of the two main reasons to convert to vegetarianism today (Ruby, 2011). However, the low proportion of vegetarians in industrialized societies as well as the growing demand for meat products globally, reveals that its ideas have never started a movement big enough to create the social change its proponents asked for (Bohm et al., 2015; Carolan, 2011; Ruby, 2011). Its societal influence can be considered neglectable and its theories are only accessible for a small academic elite. Why did its success never occur even though it raises such important concerns about our way of treating nonhuman animals and the environment? Whereas other factors have also been involved, the following section will give one possible explanation for the insufficient influence of the movement.

The theories' analysis has shown that ethical vegetarianism aims towards the eradication of the commodification of nonhuman entities. The argumentation is built from a nonanthropocentric angle so that the Other is in the center of moral concern. The Other is a subjective interpretation of the analysis. It includes nonhuman species and nature. This centering around the Other is an extraordinary and powerful way of arguing as it opens the reader the window to a reflection from a new viewpoint. However, it is also where the ideologies' biggest disadvantage lies. The commodification of nonhuman entities stems from humanity and from human culture. Humans by now cultivated most places on this earth (Hourdequin, 2015). In the future to come, the expected population growth will increase the pressure on to the environment. The human influence on the nonhuman world can therefore not be neglected. Hence, a discussion on the meat-eating culture among humans that supports the exploitation of the Other is inevitable. Carol J. Adams (1990, p.15) underlines this stating:

"While they [earnest vegetarians] think that all that is necessary to make converts to vegetarianism is to point out the numerous problems meat eating causes – ill health, death

of animals, ecological spoilage – they do not perceive that in a meat-eating culture none of this really matters.”

Meat is a symbol for hegemonic, industrial masculinity. It portrays human dominance, violence and enables the exploitation of the Other. What matters, therefore, is the gendering of meat (Adams, 1990; Connell, 2005; Hultman; 2017; Plumwood, 1993). In the ethical vegetarian ideology, the human centeredness has been left out intentionally. By actively not reflecting on the cultural roots of the meat-eating culture, the theories lack a decisive anthropocentric input. This does not mean that the goal should be an anthropocentric ideology, but the role, the interaction and the dependence of the human in regard to the environment has to be subject of discussion. After all, global environments build the basis for human existence and is source of what makes humanity – just like any other organism on earth – survive and flourish. The interconnectedness between nonhuman and human world has therefore to be of ethical concern. This becomes even more important if the goal is to overcome the destructive features of human treatment, the nonhuman world suffers from.

By not including the human culture in the equation, ethical vegetarianism, is incapable of breaking what Val Plumwood (1993) calls the ‘subject/object dualism’. Nonhuman entities can only become subjects – and thereby of moral concern – if an ethics is created that promotes the active reflection of such dominant, industrialized meat-eating culture among humans (Adams, 1990).

Instead of proposing such reflection which would increase the complexity of the vegetarian discourse, ethical vegetarian scholars see the solution to the dominant objectification paradigm in the mere recognition of intrinsic value of the nonhuman entities at stake (Singer, 1975; Regan, 2003; Callicott, 1989; Leopold, 1949). Intrinsic value thereby means the acknowledgement of value for the subjects’ own sake regardless of its use for humans or human interests. This is a valuable conclusion. However, in the ethics theories only few have made convincing arguments for the recognition of such intrinsic values. Without giving advice on how to overcome the ‘subject/object dualism’ (Plumwood, 1993) practically, an important piece in the puzzle is missing. Hourdequin (2015) argues that the only way to connect with the Other requires the ability to build an emotional connection to that individual or entity. Val Plumwood (2002) further proposes that anthropomorphism can be a way for humans to connect to the nonhuman world. Anthropomorphism means translating human character traits onto nonhuman animals. Nonetheless, neither anthropomorphism nor emotionality play a role in the ethical vegetarian ideology. If both concepts would be discussed, the theories would lose their nonanthropocentric touch as the concepts are inherently anthropocentric. Such practical advice would further lead to a debate about the kind of human culture that should be proposed in the future. The lack of a cultural aspect makes the ethic weak since it argues for a value shift that the dominant culture, which is deeply engrained in every human individual, cannot perform. Carol J. Adams (1990) claims this dominant culture to be white and male focused. Val Plumwood (2002) further sees hegemonic masculinity to be inherently linked to rationalism. While the importance of those connections will be discussed more thoroughly later on, one meaningful conclusion can be drawn in connection to ethical vegetarianism: The ideology has been written without reflecting on hegemonic masculinity. An ethic that is constructed without questioning the male-centered rational human culture which builds the basis for the commodification of the Other, can never be strong enough to create substantial social change or a value shift. In order to achieve such, the roots of commodification need to be analyzed. For now, ethical vegetarianism is mostly lived by those who are seen to be ‘naturally’ closer connected to nature and emotionality: women (Adams, 1990; 2010). Research shows, most vegetarians in industrialized societies are female (Ruby,

2011). The subject of vegetarianism as something female-centered will be discussed in the next chapter.

4.5 Why Ethical Vegetarianism is still valuable

The section above makes ethical vegetarianism and its movement seem neglectable and worthless. This is not the case. At the time it was formed, the ethical vegetarian movement almost revolutionary warned humanity against the tremendous environmental destruction that are faced today (Hourdequin, 2015; Adams, 2019).

The theories also revealed the evil: commodification of the Other. Setting the starting point to a nonanthropocentric perspective put a different light on the problematic and gave voice to those entities that are silenced. It has also to be acknowledged that the movement had impact, just not as big as hoped for. Overall, the ideology can be used as a mirror for humanity. Analyzing the actions on to the Other reveals a human carelessness and a male-centered rational human culture that needs to become subject of restructuring (Adams, 1990, 2010; Plumwood, 2002).

5. The Power of Environmental Vegetarianism

The previous chapters have argued that ethical vegetarianism in its original form is insufficient to reply to today's challenges. The urgency to act against the destruction of global environments, domestic animal exploitation and climate change has become high (Adams, 2010; Plumwood, 2002; Carolan, 2011; EAT, 2019; Foer, 2009). In order to eradicate the commodification of the Other, a different, more activist approach is needed. This chapter's goal is to reveal the power of the new movement of environmental vegetarianism. It is built on the ethical vegetarian goal to create a society that is capable of valuing Others intrinsically. Other than ethical vegetarianism, however, it breaks the subject/object dualism by mainly incorporating the ecofeminist theories of Carol J. Adams (1990, 2010) and Val Plumwood (1993, 2002). The chapter includes the construction of an ideal future. It sketches a compassionate humanity that does not build its wealth and happiness on the oppression of the Other. In the way animals are treated today, the social order reveals itself and engrained virtues can be questioned and changed. While eating meat symbolizes the masculine, patriarchal and rational human, vegetarianism becomes the activist tool that is capable of disagreeing with the dominant culture (Adams, 1990, 2010; Wright, 2015). Eating plant-based diets not only challenges hegemonic masculinity. As the pressure of climate change on humanity increases, it has become one of the most effective ways of reducing individual greenhouse gas emissions and thereby contributes to humanities' continuing existence (EAT, 2019; Rööß et al., 2015). Those two aspects make it a powerful mean to individually challenge the industrialized way of thinking and living on an everyday basis.

5.1 The Societal Roots of Commodification

The ethical vegetarian ideology lacks an understanding on the cultural roots of the commodification it criticizes. Therefore, this section aims at explaining how such is incorporated into the social construction of contemporary industrialized societies. What kind of human benefits from the dominant culture it produces and why is this culture as resilient to change?

The commodification of the Other – nonhuman but also human – roots in the idea of rationalism, a theme that is central to modern cultural history (Connell, 2005). In rationalism, reason creates the origin of knowledge. Reality has a logical structure. The body is understood to

be separate from the mind. This particular idea of rationalism was formed in the 17th century. Since the Enlightenment, it has influenced western philosophy and culture tremendously – especially, the structure of politics, science and economy (Connell 2005; Plumwood, 2002; Raworth, 2017).

Economically, it led Adam Smith to the creation of the Rational Economic Man – his famous *Homo Oeconomicus*. He is “the human character at the heart of mainstream economic theory” (Raworth, 2017, p.96) – a male figure that is “standing alone, money in hand, calculator in head, and ego in heart” (ibid). That describes a self-centered, individualist man who makes decisions based solely on calculations. The aim is to maximize his own benefit. His conclusions are at no time influenced by emotions. In an economic system that is built on rational humans, commodification becomes a mean to rationalize and thereby simplify the decision-making process. The exploitation that results from this is then socially tolerated because the individual is at no time expected to incorporate emotionality and care for others into his thinking (Connell, 2005)

The rationalism paradigm in the industrialized world has also created an influential gender role: Rationality is something inherently male while emotionality is connected to the female. Historically, the development of the capitalist society and hegemonic masculinity go in hand. Before the 18th century, women were regarded as inferior to men but of similar character. Only after, the concept of masculinity arose. It’s “conception presupposes a belief in individual difference and personal agency” (Connell, 2005, p.67). Since then, women are seen as “bearers of qualitatively different characters” (ibid, p.67). Raewyn Connell (2005) defines hegemonic masculinity as:

“Hegemonic masculinity can be defined as the configuration of gender practice which embodies the currently accepted answer to the problem of the legitimacy of patriarchy which guarantees (or is taken to guarantee) the dominant position of men and the subordination of women” (p.77).

The concept at all times is to be set in relation to femininity. Although, “not many men meet [the] normative standards” (ibid, p.81) of the hegemony, they gain from the systematic patriarchy as a whole. Partly, the concept establishes its hegemony “by its claim to embody the power of reason and thus represent the interests of the whole society” (ibid, p.164).

When masculinity and rationality are combined, capitalism is advanced and a culture grows that is based on “disembodied reason” (ibid, p.164) stemming from a socially constructed mind and body split (ibid). It has its focus “on efficiency about means rather than ultimate ends” (ibid, p.164). While Raewyn Connell’s (2005) theory centers around the gender relations among humans, Val Plumwood (1993) extends the definition of hegemonic masculinity on to the nonhuman world. She grounds her argument, concluding that the forces that destruct nature stem “from an unaccountable, mainly white, mainly male elite” (ibid, p.12). Hegemonic masculinity then no longer only includes the subordination of women and other races:

“Reason in the western tradition has been constructed as the privileged domain of the master, who has conceived nature as a wife or subordinate other encompassing and representing the sphere of materiality, subsistence and the feminine which the master has split off and constructed beneath him” (ibid, p.3).

The split between mind and body, which Connell (2005) describes as well, results in centering rationalism and marks human superiority. It led to the “human/ nature relation as a dualism” (ibid, p.2). For Plumwood (1993):

“this explains many of the problematic features of the west’s treatment of nature which underlie the environmental crisis, especially the western construction of human ‘identity’ as outside nature” (p.2).

Next to extending the definition of hegemonic masculinity, she further emphasizes that the concept cannot be entirely linked to the biological sex. This is important because women are often constructed as feminine and therefore closer to nature. They are associated with feminine virtues such as “empathy, nurturance, cooperativeness and connectedness to others and to nature” (ibid, p.9). Therefore, the conclusion that they are ecologically more conscious at all times, is tempting. Although, acknowledging that they participate in environmental movements, she notes, that women just like men engage in modern consumer culture (ibid). Judith Halberstam (1998) claims that such ‘dominant masculinity’ even only “becomes legible as masculinity where and when it leaves the white male middle-class body” (p.2). In her eyes, the concept reveals itself in female masculinity.

The economic rationalism, that – as described above – is linked to hegemonic masculinity, has established a growth-focused economy, that is built on the self-centered individual. The pressure it has put on to the planet are immense: It has caused large-scale environmental destruction. Science supports the dominant structure by delivering technological solutions to the problems, the economy causes (Connell, 2005; Plumwood, 1993; 2002). Only a small elite gains from the damages that are done. Those who embody the hegemonic masculine want to preserve the system as it is (Connell, 2005; Pulé and Hultman, 2018). Today, however, earth has become an unsafe and unjust place for both humans and nonhumans (Raworth, 2017). Therefore, “the dominance of ‘rational’ man threatens ultimately to produce the most irrational results, the extinction of our species along with many others” (Plumwood, 1993, p.7).

5.2 The Role of Meat in the Dominant Culture

The introduction of the essay reveals the great focus on meat in industrialized societies’ food consumption. It has led to immense environmental destruction – such as deforestation, biodiversity loss, or water eutrophication (Carolan, 2011; EAT, 2019; Rööß et al., 2015). This section will show how meat can be interpreted as symbol and simultaneously as influential reinforcement of hegemonic masculinity. It explains why the diet in industrialized societies centers around eating meat.

Evolutionary, the human can be claimed to have grown on meat. Hunting allowed the consumption of the valuable flesh of animals. It used to be a healthy, protein rich source of food (Fiddes, 1991). Meat as a part of the initial human nature may have eventually led to the domestication of animals. What is consumed today, however, relates barely to what meat was for human ancestors.

In her theory, Val Plumwood (1993) extended hegemonic masculinity and its definition as domination of the white male patriarch on to nature. The separation between humanity and the nonhuman world has “resulted in dangerous forms of ecological denial” (Plumwood, 2002, p.i). In an industrialized culture that has alienated itself purposefully from the Other, meat consumption builds one of the closest connection humans sustain with their own animality, nature and nonhuman species (Adams, 1990; Plumwood, 1993). Although, it may seem at first as if eating animals would enable the human bond to its own animality, the meaning of meat is majorly influenced by the construction of industrialized societies (Adams, 1990): “Meat eating is a construct, a force, an economic reality and also a very personal issue” (ibid, p.18). It is “not separate from other pressing issues of our time” (ibid, p.18). Over time, meat has become “a symbol of male dominance” (ibid, p.33). Due to the strong bond between the male sex and masculinity, men are supposed to act according to societal expectations. Hence, Carol J. Adams (1990) notes:

“It has traditionally been felt that the working men needs meat for his strength. A superstition analogous to homeopathic principles operates in this belief: in eating the muscle of strong animals, we will become strong. According to the mythology of the patriarchal culture, meat promotes strength; the attributes of masculinity are achieved through eating these masculine foods” (p. 33).

Its connection to the patriarchal attitudes of male dominance enables the production of meat in industrialized and rationalized production systems. These cover the violence that is opposed on the subject for the broad mass. Once turned into meat, the animal only remains as what Adams (1990) calls the absent referent: Its role as a conscious subject has been eradicated. What is left is the material that is eaten – its meat. “Meat eating is [therefore] the most oppressive and extensive institutionalized violence against animals” (ibid, p.70).

Although, it may seem as if the oppression is intentional, the “participation evolves as part of our general socialization to cultural patterns and viewpoints” (ibid, p.43). It is the general social structure that enables both men and women to objectify and exploit the Other. Connell (2005) wrote that masculinity always only appears in relation to femininity. When meat becomes the powerful symbol of the hegemonic masculine, it marks the oppression of the feminine at the same time. This has two important implications: Women are perceived as feminine and hence are linked to lower, vegetarian foods (Adams, 1990; Plumwood, 1993). Further, it implies that the feminine virtues “empathy, nurturance, cooperativeness and connectedness to others and to nature” (Plumwood, 1993, p.9) are suppressed by the dominant culture, both men and women participate in.

Besides, the instrumentalization of the animal as food product, the objectification of the Other is deeply engrained into the language of the dominant culture. It is male-centered and human-centered. Animals are both feminized and neutralized. Thereby, the language reinforces the subject/object dualism and “distances us from the reality of meat eating” (Adams, 1990, p.70).

“Eating animals acts as a mirror and representation of patriarchal values.” (ibid, p.187). This is why, “the meaning of meat is reproduced each time it is served and eaten“ (ibid, p.91). Meat reinforces and symbolizes hegemonic masculinity and thereby Western economic rationalism (Adams, 1990; Connell, 2005; Plumwood, 1993). Its consumption undermines not only the animals whose bodies are eaten. The violence and cruelty it symbolizes socially, supports inequality on a global level. All those that do not embody the industrial masculine are

left behind (Hultman, 2017; Adams, 1990). It is then no surprise that meat consumption is rising extensively on a global scale (Carolan, 2011). Meat portrays luxury, pleasure and material wealth. The economic rationalism of the industrialized world has promoted those as means to happiness, successfully for a long time. In what ways material wealth fosters human happiness cannot be discussed within the scope of this essay. The ideal of a compassionate society, however, will claim that the human character needs more for being in comfort. The social interaction and interconnection with others are thereby crucial. In addition, scientists have concluded that the planet has no capacity to sustain the future world population with industrialized societies' diets and consumption patterns (EAT, 2019; Rööß et al., 2015).

Meat is often believed to be a natural food. It is portrayed as the one and only food humanity has grown on evolutionary. Human ancestors survived on a food system that implied hunting, killing, cutting up and eating. In the industrialized world, this system does only still exist as a fun, sportive activity. It is not what supplies the broad societal mass with animal flesh. What is eaten today, is a different, a new product. It is produced geographically distant from human eyes. Great numbers of animals are kept in confined places. Their bodies have been altered in a way to make them gain weight as efficient and quick as possible. Their diet supports their weight gain. The interest is low to adjust their food in accordance with their digestive systems and physical needs. Domesticated animals have been turned into organic but industrialized production machines. Eventually, they are turned into a product that can be bought in supermarkets – clean and sealed in plastic. The package only vaguely reminds its consumer that what is eaten has once lived and breathed. The process' inherent cruelty, violence and disrespect make it subject for change. The theories analyzed in this essay clarify this in various ways (Carolan, 2011; Foer, 2009; Pascalev, 2006; Regan, 2003; Singer, 1975; Stuart et al., 2013). However, the mere exploitation of the nonhuman is not the only reason the animal production complex requires abolition. The way animals are bred, kept and fed, mirrors the industrial societal development. It portrays the inequality and carelessness that economic rationalism entails (Adams, 2010; Plumwood, 1993; 2002). Whereas dominant economic theory emphasizes the importance of the individual, the individual and its requirements are no longer subject of concern. Most parts of the industrialized society are obliged to ensure the spinning of the wheel for economic growth. That happens based on the assumption that eventually everyone will have earned their share of wealth. In order to not fall back, people move to the city (Milford et al., 2019; Raworth, 2017).

Their living situation then resembles the small and confined space, domesticated animals inhabit. Working to sustain oneself as well as the economy is the main interest. Whatever makes the human thrive falls short. This is reflected in the food consumption patterns. The interest in convenience products has grown massively and fast food chains have gained influence (Carolan, 2011; Milford et al., 2019). Eating has become something distant. Whereas it used to be the essence of life, it has been set into the background. The interest in the origin of the products stacked in supermarkets is low. People have lost the connection to what they eat and how they eat. This has resulted in daunting health issues that can be traced back to food consumption (Bohm et al., 2015). In a time where eating has become a necessity, it is not only the Other that is commodified. The human has become victim of its own creation. The dominant rationalist culture has turned it into a commodity.

What meat is today, is a problem on many levels. It stands for a cultural construct that is of existential danger for essentially all living entities.

5.3 The Ideal: A Compassionate Humanity

The previous section in this chapter conceptualized the roots of commodification and how it leads to the exploitation of the human and the Other. As of today, there has no solution been found to solve the problems, economic rationalism entails. Therefore, this chapter takes on the approach of designing a humanity that is compassionate instead of rational. The question at stake is: What kind of human is a society like this built on and what is the new human live goal?

Humanity has used its naturally given capability of empathy to create a compassionate society. When empathy is the “fundamental way in which we relate to other beings in the moral sphere of lives” (Curtin, 2014, p.41), “compassion is a cultivated feeling about emotion” (ibid, p.46). It marks where feeling, thinking and acting come together (ibid). Compassion then builds the basis for an ethics of care that majorly concerns a reflection about the other’s pain (Alvaro, 2019). As the goal is to avoid hurting others, a compassionate humanity lives temperate lives that fulfill only their basic needs.

A compassionate humanity lives in the sweet spot of Kate Raworth’s (2017) donut. That means a way of living so that the needs of all are satisfied without transgressing the planetary capacities. The economic growth paradigm has been abolished. The claim that the accumulation of wealth would eventually trickle down on to the poor and solve environmental issues simultaneously, is only talked about as a myth from the past. An economic system is in place that is built on human and global complexity (ibid). It is centering around the planet’s living entities, their intrinsic values and needs. The exploitation of the Other and the inequality among humanity is overcome. Instead, global equality enables all living entities to thrive.

Just in time, Western thinking has understood that the human character cannot be reduced to the ‘rational man’. Instead of further encouraging the industrial masculine and its abusive relationship to the Other, the new hegemony has become ecological masculinity (Hultman, 2017). It centers around being compassionate but also caring, humble and sharing (Alvaro, 2019; Curtin, 2014; Hultman, 2017). “As change agents, ecological masculine subjects do not shut themselves off from society, but create alternative projects amidst the dominant model” (Hultman, 2017, p. 247). What used to be considered feminine and female only, is now also part of the ecological masculine. The virtues “empathy, nurturance, cooperativeness and connectedness to others and to nature” (Plumwood, 1993, p.9) are no longer suppressed by the dominant culture but have been embraced instead. Hence, the new socialization encourages both men and women to adapt to such virtues of care as cultural patterns. This has minimized the gender gap

Happiness is no longer sought, through material wealth but through compassionate and caring actions towards other members of the biotic community. The role of the community – global and local, human and nonhuman – has been emphasized. A compassionate human has understood that the satisfaction and material wealth maximization of the individual is anything but sustainable. Such a virtuous way of living constitutes the new harmony between the human and its surrounding environment. It has been realized that humanity is deeply embedded into nature. Its existence is highly dependent upon it. Therefore, industrial farming practices are no longer present. Instead of reproducing industrial masculinity in an industrialized meat production and consumption culture, the human diet is no longer violent or cruel. Ecological masculinity promotes an eating culture that reflects on the compassion paradigm outlined above. Overconsumption has been eradicated. When animals are to be consumed, their pain is of tremendous concern. Instead of being an absent referent, they have become a present referent. They have moved from object to subject – a subject that is as sentient and subject of a life as any human.

5.4 The Power of Environmental Vegetarianism

The previous section described the compassionate humanity as ultimate goal for the future to come. Designing such an ideal served demonstrating the contrast between the contemporary and the ultimate. Whereas the latter is from current point of view very unrealistic, it helps to conceptualize where the end goal, the 'sweet spot' should be placed (Raworth, 2017). Currently, it is humanity that is hit by its own irrationality. Persisting ignorance will eventually guide the human species and those who are victims to it into extinction (Callicott, 2018; Plumwood, 1993). If humanity wants to sustain itself, it is time for inherent social change. How does this relate to the power of environmental vegetarianism?

This essay started with a quote from J.Baird Callicott (1989, p.34): "There is nothing more intimate than eating, more symbolic of the connectedness of life, and more mysterious. What we eat and how we eat is by no means of insignificant ethical concern."

Eating is "intimate" because it serves the very personal needs, taste and shapes the identity. It is "symbolic of the connectedness of life" because it has at all times an interconnection to another entity. Not only is this a dependence on those that give us the energy to survive. It also shapes the social structures to live in and creates bonds with others. It is "mysterious": Although, it is fairly obvious that there is a need to eat, it is its complexity that makes it more than just the energy that the body needs. What is even more important, is the power of eating. It is powerful because of the dependence it creates among others. It is powerful because it shapes and influences a life on a daily basis.

Meat has gained influence due its role as a symbol for hegemonic masculinity and economic rationalism (Adams, 1990; Connell, 2005; Plumwood, 1993). The culture it portrays is problematic because it leads to the commodification of all, no matter if human or nonhuman. Some may be materially better off, some worse. Notwithstanding, it makes no one a clear winner because it hinders all living species from thriving in a virtuous way. It does not guide towards compassion.

That is why, the goal must be to overcome the presently dominant culture and move towards a compassionate society where hegemonic masculinity will be defined as an ecological masculinity (Adams, 1990; Curtin, 2014; Hultman, 2017). The adaptation of a plant-based diet is crucial to achieve this goal because "vegetarianism covertly challenges a patriarchal society" (Adams, 1990, p.17). This is because "holding a minority opinion in a dominant culture is very illuminating" (ibid, p.18). This is how it can support the shift from an industrial to an ecological masculinity (Hultman, 2017).

Women have historically been identified with plant-based diets. Whereas meat is associated with physical strength, vegetarianism mirrors emotionality and vulnerability, in short femininity. Femininity is further associated with care and empathy, the fundamentals for creating an ethics built on compassion. The problem is that femininity mainly refers to the female body. This is because women have been object of male suppression for a long time (Adams, 1990; Connell, 2005; Curtin, 2014). Today, the biological sex can only indicate a person's gender roles, although, there is still emphasis on men being male and women female (Plumwood, 1993). It can be claimed, however, that the industrialized human embodies both femininity and industrial masculinity at the same time (Hultman, 2017; Plumwood, 1993). Notwithstanding, femininity has been of lower value, ever since the gender roles have been defined. Hence, embodying femininity is still perceived as weakness.

Set in relation to the meat-eating centrality in the industrialized world, vegetarianism is the opponent that “threatens the larger patriarchal culture” (Adams, 1990, p. 37) by embracing the feminine. Especially men, who turn towards a plant-based diet are considered as intimidating. They openly reveal their disagreement with a crucial part of their industrial masculinity by actively embodying femininity (ibid). From an ecofeminist perspective vegetarianism is meant “to stop the story of meat” (ibid, p.94). However, until now it has faced a powerful obstacle. Meat eating dominates the social structure. A big part of such structure is the language that is used. This is where vegetarianism has been struggling although being an influential tool: “Vegetarians face the problem of making their meanings understood within a dominant culture that accepts the legitimacy of meat eating” (ibid, p. 76). The ability to speak has always been used as argument to justify the inferiority of nonhuman species (Singer, 1975; 2009). Hence, language is perceived as very important mean for the human character to connect with others. When the words that are spoken revolve around meat, then vegetarianism has no voice to make its argument heard:

“When vegetarians attempt to disarm the dominant control of language, they are seen as picky, particular, embittered, self-righteous, confrontative, and especially sentimental, rather than political liberators like Washington and Lincoln” (Adams, p.77).

This means that their voices have been silenced based on the femininity a plant-based diet symbolizes. Adams (1990) concludes that in a society where meat is dominant, having vegetarianism written down, is the only way of giving the vegetarian argument a voice. Here, environmental vegetarianism starts playing its powerful role. Recently, the vegetarian argument has received influential support from the natural sciences. Ever since geochemist Paul Crutzen officially declared the Anthropocene in 2000, climate change has “become the defining issue of our time” (UN, 2020; Heuretebise, 2017). It is the symbol of a broken world that suffers from the consequences of global warming and other humanly induced environmental destructions. The damages of the industrial development are potentially not restorable (McLaren, 2018; Steffen et al., 2015).

It has become a scientific consensus that meat cannot be the most valued source of food for the future global population. Its impact on the environment is known to be too destructive. Creating food by transforming vegetable biomass into muscle mass of animals is energetically inefficient. This transformation process makes meat production a major contributor to global greenhouse gas emissions. The production processes further need tremendous amounts of fresh water, a resource that is known to be scarce in the future. Besides, the hunger for meat causes deforestation, water eutrophication and biodiversity loss (Carolan, 2011; Bohm et al., 2015; EAT, 2019; Rööß et al., 2015). Based on the given arguments and the current urgency to counteract climate change, meat centrality has become target of the well-accepted language of science. That is why the EAT-Lancet commission (2019) calculated a planetary diet plan. The goal is to adapt sustainable farming practices and reduce the consumption of animal products drastically.

Ever since science has taken on the task of warning for the consequences of climate change for humanity, environmental sustainability has started to become more famous than ever before. It could be criticized, that science has always been a strong reinforcement of rationalism (Plumwood, 1993). Thereby, it supports hegemonic masculinity. Notwithstanding, the beginning of inherent social change can only happen if humanity understands the severity of the current situation. By using a language everyone understands, the human ability to reason can be used to overcome its own rationality. For now, the vegetarian argument has only benefited from the scientific conclusion. No longer, the dominant culture is able to reduce the argumentation to

sentimentality or emotionality (Adams, 1990). On a broader scale people start understanding, that the human existence is at stake. It is not the planet that fights back. It does not punish humanity with climate change. The human existence has only been a blink of the eye in earth's history. Essentially, the planet does not care whether humanity survives or not. Even though the traces the species would leave, would be big, they would be overcome (Callicott, 2018).

Hence, those who have understood the situation's seriousness, have joined the environmental vegetarian movement. It is a lot of young people who criticize decision makers insufficient action against global warming and environmental degradation (FFF, 2020). They demonstrate against "ecocide, oppression and patriarchy" and "the risk of social collapse" (ER, 2020). Instead of fostering economic growth and the wealth of a small elite, they want global leaders to tackle the growing inequality and the planet's integrity so that future generations are not left with a broken world (ER, 2020; FFF, 2020; McLaren, 2018; Will, 2019). In summary, they want the dominant industrial culture to be eradicated.

In the fight against this culture, the vegetarian argument has never been as strong. Environmental vegetarianism is a boycott. It threatens the patriarchy. Today, it is supported by the influential language of science which makes the communication easier. It criticizes the dominant culture individually on an everyday basis (Adams, 2010; EAT, 2019). It reaches society on a personal level because it challenges the identity of everyone. Every time, meals are served, justification is demanded of those who have not followed the movement yet, those who have not understood yet. Some are offended, some argue, technology will solve the issues that are faced today, but some also understand. Unlike the ethical vegetarian movement 45 years ago, the new movement grows rapidly. The activist's realization does not mean that they have reached the ideal. It does not ultimately make them compassionate humans. They still live within the dominant culture. In the way it overarches the entire human identity, it cannot be escaped from (Adams, 1990). Notwithstanding, they believe that humanity is capable of being more than a commodifying unit of global destruction. They believe that there is a chance to reach the sweet spot of the donut (Raworth, 2017). They essentially believe that the creation of a compassionate humanity is possible.

6. Conclusion

Ever since the Enlightenment period and the industrialization, societies have invested energy into the idea that the human is a rational, individualist man and therefore capable of controlling the natural world (Plumwood, 1993; 2002; Raworth, 2017). Over time, this has caused the degradation of ecosystems on a global scale. Today, human induced climate change puts tremendous pressure on the industrialized world and even worse pressure on the non-affluent world. If the extinction of the human and other entities is to be avoided, cultural change is needed now (Raworth, 2017; Steffen et al., 2015). Humanity must understand that instead of rational, industrial masculine, humans are a feeling and vulnerable species that is deeply interconnected with others and dependent on this planet (Curtin, 2014; Hultman, 2017; Plumwood, 2002). Hence, the goal must be to overcome hegemonic masculinity and embrace ecological masculinity which is built on compassion. Empathy towards others, no matter if human or nonhuman, will lead to the creation of an ethics of care which builds the basis for a compassionate humanity.

For centuries, meat consumption stood for wealth and power. It is the symbol of hegemonic masculinity because it promotes the human dominance over others (Adams, 1990; Plumwood, 1993; 2002). The dominant food system in the Anthropocene centers around the large-scale production of animal products. This has caused immense environmental degradation and greenhouse gas emissions contribute massively to climate change (Carolan, 2011; EAT,

2019; Rööß et al., 2015). Instead of wealth and power, the food system symbolizes a broken world that is probably not repairable (McLaren, 2018). Vegetarianism challenges hegemonic masculinity because it embodies the feminine by rejecting meat centrality (Adams, 1990). Whereas it has been deemed emotional and sentimental for a long time, it recently earned new justification from the natural science. The conclusion that the dominant food system is inherently unsustainable, has made the vegetarian argument stronger than ever (ibid; EAT, 2019). The growing concern about climate change and environmental destruction with regard to the future of humanity gave rise to the environmental vegetarian movement. It guides to the ideal of a compassionate humanity. It is a powerful activist tool that questions the contemporary order. It opposes hegemonic masculinity and its inherent social structure on an everyday basis. Its power is enhanced by an increasing pressure from environmental forces on to humanity and other victimized species. Those who use the tool have understood that it is not nature fighting back but humanity that is hit by its own irrationality (Callicott, 2018; Plumwood, 1993).

6.1 Personal Reflections and Limitations

As shortly stated in the beginning of the essay, I have written about this topic because I am personally interested in it. I see myself as part of the movement and the analysis of the issue has led me to a clear conclusion. The situation as it is today, is frustrating. This is why, I intentionally used a language that gives a clear understanding of my, an activist, standpoint. It was to clarify the urgency to act against climate change.

Analyzing the topic of meat consumption in regard to environmental vegetarianism for a while, I realized how complex and politicized the topic is. Grasping the issue within the scope of this thesis, has therefore led to limitations. The following are some important examples: It is unrealistic that a future society will abstain from meat consumption entirely. After all, it is of immense cultural and traditional value (Bohm et al., 2015). In what way meat can play a role in the compassionate humanity is surely of interest.

Besides, it was not possible to distinct between vegetarianism and veganism. Hence, the discussion of the role of other animal products than meat fell short. Adams (1990) for example sees the consumption of eggs and milk products as exploitation of the female body. Milk products also have tremendous environmental impacts (Rööß et al., 2015). Therefore, investigating the distinction between veganism and vegetarianism in the given context could be of importance in further research. Furthermore, it would have been interesting to deepen the analysis of male and female in the context of the topic. Although, I tried incorporating it in some way, I would have loved to write more. However, the limited time scope did not allow a deeper reflection.

References

- Adams, C.J. (1990) *The Sexual Politics of Meat, A Feminist Vegetarian Critical Theory*. New York, London: Continuum
- Adams, C.J. (2010) 'Why feminist vegan now?', *Feminism & Psychology*, 20(3) [online]. DOI: 10.1177/0959353510368038
- Alvaro, C. (2019) *Ethical Veganism, Virtue Ethics, and the Great Soul*. Lexington Books Auxter, T (1999) 'The right not to be eaten' in Walter, K.S., Portmess, L. (ed) *Ethical vegetarianism*. New York: State Univers. of New York Press, pp.177-189

- Bohm, I., Lindblom, C., Åbacka, G., Bengs, C., & Hörnell, A. (2015), ‘ “He just has to like ham” The centrality of meat in home and consumer studies’, *Appetite*, 95 [online]. DOI: 10.1016/j.appet.2015.06.015
- Bruers, S. (2015) ‘In Defense of Eating Vegan’, *Journal of Agricultural and Environmental Ethics*. 28(4) [online]. DOI: 10.1007/s10806-015-9555-x
- Carolan, M. (2011). *The Real Cost of Cheap Food*. New York: Earthscan
- Callicott, J.B. (1989) *In defense of the land ethic: essays in environmental philosophy*. New York: Oxford University Press
- Callicott, J.B. (1995) ‘The Value of Ecosystem Health’, *Environmental Values*, 4(4) [online]. Available at: <https://www.jstor.org/stable/30301570> (06/05/2020)
- Callicott, J.B. (2018) ‘Environmental Ethics in the Anthropocene’, *Transtext(e)s Transcultures*, 13 [online]. Available at: 10.4000/transtexts.1064 (06/05/20)
- Connell, R. (2005) *Masculinities, Second Edition*. Los Angeles, Berkley: University of California Press
- Curtin, D. (2014) “Compassion and Being Human” in Adams, C.J., Gruen, L. *Ecofeminism, feminist intersections with other animals & the earth*. New York: Bloomsbury Deckers, J. (2009) ‘Vegetarianism, Sentimental or Ethical?’, *Journal of Agricultural and Environmental Ethics*, 22(6), [online]. DOI: 10.1007/s10806-009-9176-3
- EAT-Lancet Commission (EAT) (2019). ‘Healthy Diets from Sustainable Food Systems - Food Planet Health’, [online]. Available at: https://eatforum.org/content/uploads/2019/01/EAT-Lancet_Commission_Summary_Report.pdf (08/06/20)
- Extinction Rebellion (ER) (2020) Extinction Rebellion [online]. Available at: <https://rebellion.earth> (08/06/20)
- Fiddes, N. (1991) *Meat a natural symbol*. 1. Edition London: Routledge
- Foer, J. (2009) *Eating Animals*. 1. Edition. New York: Back Bay Books
- Fridays for Future (FFF) (2020) Fridays for Future [online]. Available at: <https://fridaysforfuture.se> (10/06/20)
- Gardiner, S.M. (2017) *The Oxford handbook of environmental ethics*. Oxford Handbooks Online. Available at: 10.1093/oxfordhb/9780199941339.001.0001 (06/05/20)
- Gjeris, M., Ebbe Juul Nielsen, M., Sandoe, P. (2013). *The Good the Right and the Fair: An introduction to ethics*. Milton Keynes: Lightning Source
- Halberstam, J. (1998) *Female Masculinity*. London: Duke University Press
- Heuretbeise, J. (2017) ‘Sustainability and Ecological Civilization in the Age of Anthropocene: An Epistemological Analysis of the Psychosocial and “Culturalist” Interpretations of Global Environmental Risks’, *Sustainability*, 9 [online]. Available at: 10.3390/su908133
- Hourdequin, M. (2015) *Environmental ethics: from theory to practice*. London: Bloomsbury Academic.
- Hultman, M. (2017) “Exploring industrial, ecomodern and ecological masculinities” in Sherilyn MacGregor (ed) *Routledge Handbook of Gender and Environment*. Abington: Routledge
- ‘Interview mit Greta Thunberg: “Ich bin Realistin. Ich sehe Fakten“ ‘ (2019) Anne Will, Das Erste, 31/03/2019
- Jackson, S.J. (2014) “Rethinking repair” in Gillespie T, Boczkowski P.J., Foot K.A. (ed) *Media Technologies: Essays on Communication, Materiality,*

- and Society. Cambridge, MA: MIT Press Leopold, A.I. (1992) *A Sand County Almanac*. New York: Oxford University Press.
- McLaren, D. (2018) 'In a broken world: Towards an ethics of repair in the Anthropocene', *The Anthropocene Review*, 5(2) [online]. DOI: 10.1177/2053019618767211
- Milford, A.B., Le Mouél, C., Bodirsky, B.L., Rolinski, S. (2019). 'Drivers of Meat Consumption' *Appetite*, 141, [online] DOI: 10.1016/j.appet.2019.06.005
- Moore, J.H. (1999) 'Universal Kinship' in Walter, K.S., Portmess, L. (ed) *Ethical vegetarianism* New York: State Univ. of New York Press, pp.127-135
- Moore Lappé, F. (1990) *Diet for a Small Planet*. New York: The Random House Publishing Group
- Noveck, J. (2005) "Pigs and People: Sociological Perspectives on the Discipline of Nonhuman Animals in Intensive Confinement" *Society and Animals*, 13/3, pp.221-242
- Pascalev, A.K. (2006), "We and they: Animal welfare in the era of advanced agricultural biotechnology" *Livestock Science*, 103/3, [online] DOI: 10.1016/j.livsci.2006.05.007
- Plumwood (1993) *Feminism and the Mastery of Nature*. London; New York: Routledge
- Plumwood (2002) *Environmental Culture, The Ecological Crisis of Reason*. London: Routledge
- Pulé, P., Hultman, M. (2018) "Industrial/breadwinner masculinities" in Hultman, M, Pulé, P. (ed.) *Ecological Masculinities: Theoretical Foundations and Practical Guidance*. Milton: Taylor & Francis Group
- Raworth, K. (2017). *Doughnut Economics*. London: Random House Business Books
- Raworth, K. (2017a) 'Get savvy with systems', Donut Economics Action Lab, YouTube, 27/02/2017
- Regan, T. (2003) *Animal rights, human wrongs: an introduction to moral philosophy*. Lanham: Rowman & Littlefield Publishers
- Röös, E., Patel, M., Spångberg, J., Carlsson, G., Rydhmer, L. (2015) 'Limiting livestock production to pasture and by-products in a search for sustainable diets', *Food Policy*, 58 [online] Available at: 10.1016/j.foodpol.2015.10.008
- Ruby, M., (2011) 'Vegetarianism. A blossoming field of study', *Appetite*, 58, [online]. Available at DOI: <https://doi.org/10.1016/j.appet.2011.09.019> (06/05/20)
- Shiva, V. (1997). *Biopiracy*. Toronto: Between the Lines. Singer, P. (1975) *Animal liberation: a new ethics for our treatment of animals*. New York: Random House
- Singer, P. (2009) *Animal liberation: The definitive classic of the animal liberation movement*. New York: Open Road Integrated Media
- Steffen W, Persson Å, Deutsch L et al. (2011) 'The Anthropocene: From global change to planetary stewardship', *AMBIO*, 40 [online]. DOI: 10.1007/s13280-011-0185-x
- Steffen, W., Richardson K., Rockström J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., de Vries, W., de Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Rayers, B., Sörlin, S. (2015). "Planetary Boundaries: Guiding human Development on a changing Planet", *Science*, 347, [online]. DOI: 10.1126/science.1259855
- Stuart, D., Schewe, R.L., Gunderson, R., (2013) "Extending Social Theory to Farm Animals: Addressing Alienation in the Dairy Sector" *Sociologia Ruralis*, 53/2, pp.201-222, DOI: 10.1111/soru.12005

- Thompson, P. (2015). From Field to Fork. Oxford Scholarship Online. Available at: <https://www-oxfordscholarship-com.ezproxy.its.uu.se/view/10.1093/acprof:oso/9780199391684.001.0001/acprof-9780199391684-chapter-2> (07/06/20)
- United Nations (UN) (2020), United Nations, Climate Change [online]. Available at: <https://www.un.org/en/sections/issues-depth/climate-change/> (08/06/20)
- Wenz, P.S. (1999) “An ecological argument for vegetarianism“ in Walter, K.S., Portmess, L. (ed) *Ethical vegetarianism* New York: State Univers. of New York Press, pp. 189-203.
- Winders, B., Nibert, D. (2004) ‘Consuming the surplus: expanding “meat” consumption and animal oppression’ *International Journal of Sociology and Social Policy*, 24, [online] Available at: DOI: 10.1108/01443330410790786 (06/05/20)
- Wright, L. (2015) *The vegan studies project: food, animals, and gender in the age of terror*. Athens: The University of Georgia Press.
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Originally published as Laier, Carolin. “The Power of Environmental Vegetarianism.” 2020. Master’s Thesis. Uppsala University.

Meat Accounts for Nearly 60% of all Greenhouse Gases from Food Production

by Oliver Milman

Production of meat worldwide causes twice the pollution of production of plant-based foods, a major new study has found

The global production of food is responsible for a third of all planet-heating gases emitted by human activity, with the use of animals for meat causing twice the pollution of producing plant-based foods, a major new study has found.

The entire system of food production, such as the use of farming machinery, spraying of fertilizer and transportation of products, causes 17.3bn metric tonnes of greenhouse gases a year, according to the research. This enormous release of gases that fuel the climate crisis is more than double the entire emissions of the US and represents 35% of all global emissions, researchers said.

“The emissions are at the higher end of what we expected, it was a little bit of a surprise,” said Atul Jain, a climate scientist at the University of Illinois and co-author of the paper, published in *Nature Food*. “This study shows the entire cycle of the food production system, and policymakers may want to use the results to think about how to control greenhouse gas emissions.”

The raising and culling of animals for food is far worse for the climate than growing and processing fruits and vegetables for people to eat, the research found, confirming previous findings on the outsized impact that meat production, particularly beef, has on the environment.

The use of cows, pigs and other animals for food, as well as livestock feed, is responsible for 57% of all food production emissions, the research found, with 29% coming from the cultivation of plant-based foods. The rest comes from other uses of land, such as for cotton or rubber. Beef alone accounts for a quarter of emissions produced by raising and growing food.

Grazing animals require a lot of land, which is often cleared through the felling of forests, as well as vast tracts of additional land to grow their feed. The paper calculates that the majority of all the world’s cropland is used to feed livestock, rather than people. Livestock also produce large quantities of methane, a powerful greenhouse gas.

“All of these things combined means that the emissions are very high,” said Xiaoming Xu, another University of Illinois researcher and the lead author of the paper. “To produce more meat you need to feed the animals more, which then generates more

emissions. You need more biomass to feed animals in order to get the same amount of calories. It isn't very efficient."

The difference in emissions between meat and plant production is stark – to produce 1kg of wheat, 2.5kg of greenhouse gases are emitted. A single kilo of beef, meanwhile, creates 70kg of emissions. The researchers said that societies should be aware of this significant discrepancy when addressing the climate crisis.

"I'm a strict vegetarian and part of the motivation for this study was to find out my own carbon footprint, but it's not our intention to force people to change their diets," said Jain. "A lot of this comes down to personal choice. You can't just impose your views on others. But if people are concerned about climate change, they should seriously consider changing their dietary habits."

The researchers built a database that provided a consistent emissions profile of 171 crops and 16 animal products, drawing data from more than 200 countries. They found that South America is the region with the largest share of animal-based food emissions, followed by south and south-east Asia and then China. Food-related emissions have grown rapidly in China and India as increasing wealth and cultural changes have led more younger people in these countries to adopt meat-based diets.

The paper's calculations of the climate impact of meat is higher than previous estimates – the UN's Food and Agricultural Organization has said about 14% of all emissions come from meat and dairy production. The climate crisis is also itself a cause of hunger, with a recent study finding that a third of global food production will be at risk by the end of the century if greenhouse gas emissions continue to rise at their current rate.

Scientists have consistently stressed that if dangerous global heating is to be avoided, a major rethink of eating habits and farming practices is required. Meat production has now expanded to the point that there are now approximately three chickens for every human on the planet.

Lewis Ziska, a plant physiologist at Columbia University who was not involved in the research said the paper is a "damn good study" that should be given "due attention" at the upcoming UN climate talks in Scotland.

"A fundamental unknown in global agriculture is its impact on greenhouse gas emissions," Ziska said. "While previous estimates have been made, this effort represents a gold standard that will serve as an essential reference in the years to come."

Originally published in *The Guardian* 13 September 2021:
<https://www.theguardian.com/environment/2021/sep/13/meat-greenhouses-gases-food-production-study>

Sugar Produces Bitter Results for the Environment

By Earth Talk/Frederic Beaudry

Sugar is present in products we consume every day, yet we rarely give a second thought to how and where it is produced and what toll it may take on the environment.

Sugar Production Damages the Environment

According to the World Wildlife Fund (WWF), roughly 145 million tons of sugars are produced in 121 countries each year. And sugar production does indeed take its toll on surrounding soil, water and air, especially in threatened tropical ecosystems near the equator.

A 2004 report by WWF, titled “Sugar and the Environment,” shows that sugar may be responsible for more biodiversity loss than any other crop, due to its destruction of habitat to make way for plantations, its intensive use of water for irrigation, its heavy use of agricultural chemicals, and the polluted wastewater that is routinely discharged in the sugar production process.

Barrier Reef off the coast of Australia

Waters around the reef suffer from large quantities of effluents, pesticides, and sediment from sugar farms, and the reef itself is threatened by the clearing of land, which has destroyed the wetlands that are an integral part of the reef’s ecology.

Meanwhile, in Papua New Guinea, soil fertility has declined by about 40 percent over the last three decades in heavy sugar cane cultivation regions. And some of the world’s mightiest rivers—including the Niger in West Africa, the Zambezi in Southern Africa, the Indus River in Pakistan, and the Mekong River in Southeast Asia—have nearly dried up as a result of thirsty, water-intensive sugar production.

Do Europe and the U.S. Produce Too Much Sugar?

WWF blames Europe and, to a lesser extent, the United States, for over-producing sugar because of its profitability and therefore large contribution to the economy. WWF and other environmental groups are working on public education and legal campaigns to try to reform the international sugar trade.

“The world has a growing appetite for sugar,” says Elizabeth Guttentstein of the World Wildlife Fund. “Industry, consumers and policy makers must work together to make sure that in the future sugar is produced in ways that least harm the environment.”

Can Everglades Damage From Sugar Cane Farming be Reversed?

Here in the United States the health of one of the country's most unique ecosystems, Florida's Everglades, is seriously compromised after decades of sugar cane farming. Tens of thousands of acres of the Everglades have been converted from teeming sub-tropical forest to lifeless marshland due to excessive fertilizer run-off and drainage for irrigation.

A tenuous agreement between environmentalists and sugar producers under a "Comprehensive Everglades Restoration Plan" has ceded some sugar cane land back to nature and reduced water usage and fertilizer run-off. Only time will tell if these and other restoration efforts will help bring back Florida's once teeming "river of grass."

Originally published on ThoughtCo. <https://www.thoughtco.com/effect-of-sugar-on-the-environment-1204100>

Smoking Experiments on Animals

by People for the Ethical Treatment of Animals (PETA)

Health officials have known for decades that smoking cigarettes causes disease in nearly every organ of the human body and that animal tests are poor predictors of these effects. Yet cruel, irrelevant animal tests are still being conducted. In these tests, rats sealed in small canisters are forced to breathe cigarette smoke or vapors from electronic cigarettes (e-cigarettes) for up to six hours straight, every day, for as long as two years.

In the past, experimenters attached tubes to holes in dogs' and monkeys' necks or strapped masks to their faces to force smoke into their lungs. In other experiments, experimenters applied cigarette tar directly to mice and rats' bare skin to induce the growth of skin tumors.

Crucial Differences

Different animals have different reactions to toxins, and animals in laboratories aren't exposed to cigarette smoke or e-vapors in the same manner or time frame as human smokers are—making animal tests poor predictors of the results in humans.

The link between tobacco and lung cancer in humans was obscured for years because data collected from experiments on animals did not show this relationship. This isn't surprising when you consider the biological differences between humans and other animals, such as the following:

- Rats breathe faster than humans and only through their noses, whereas humans can breathe through their nose or mouth.
- Rats live close to the ground, and their noses do a better job of filtering the air they inhale.
- A rat's nose is smaller than a human's nose, and therefore, a rat cannot inhale larger particles that can enter human lungs.
- The cells found in rat and human lungs differ, which affects their ability to cope with toxins.

Simply put—rats or other animals shouldn't be used to predict what might happen in humans.

Are Smoking Experiments on Animals Required?

Belgium, Estonia, Germany, Slovakia, and the U.K. have banned tobacco product development and testing using animals (see footnotes 1-5).

U.S. law does not have outright requirements for toxicity testing of tobacco products (including e-cigarettes) or their ingredients on animals. Manufacturers of these products must show the U.S. Food and Drug Administration's (FDA) Center for Tobacco Products (CTP) that any new products are equally or less toxic than conventional cigarettes, and they can choose what test methods to use to do so. However, the CTP may reject a company's application that doesn't include animal tests and suggest testing on animals in order to get a product on the market.

In addition, animal experiments to study the diseases caused by cigarette smoking is commonplace, especially at universities. For example, in 2015, a useless study conducted at three U.S. universities forced monkeys to inhale cigarette smoke for six hours every day for one year before they were killed, only to confirm that a biomarker of chronic obstructive pulmonary disease (COPD) was reduced—something that had been known from human COPD patients since at least 1992 (See footnotes: 6, 7).

The Way Forward

Instead of conducting animal tests, companies can use non-animal (computer- and human cell-based) tests and the existing body of knowledge from human epidemiological and clinical studies about the health concerns associated with smoking.

Non-animal methods¹²² overcome the species-specific differences between humans and rodents and can deliver human- relevant data. For example, three-dimensional tissue models of the human respiratory tract can be used. These tissues can be formed from cells of donors of different ages, sexes, and races as well as former or current smokers or patients with smoking-related diseases such as COPD.

To end experiments on animals, PETA funds the development of non-animal tests and PETA scientists attend and host meetings and workshops to persuade researchers and regulators around the world to end tests on animals. In addition, since the FDA was given the authority to regulate tobacco in 2009, PETA has submitted scientific comments on numerous occasions, urging the agency not to require tests on animals and allow tobacco companies to submit data from modern non-animal tests. PETA began a shareholder campaign in 2005 by filing a resolution with Altria Group, formerly Philip Morris Companies, Inc. PETA then filed shareholder resolutions with Philip Morris International and R.J. Reynolds Tobacco Company, calling on them to end experiments on animals. In 2013, Lorillard Tobacco Company (which R.J. Reynolds purchased in 2014) issued a policy¹²³ banning all animal testing unless such tests become required by federal

¹²² See <https://www.peta.org/issues/animals-used-for-experimentation/alternatives-animal-testing>

¹²³ See <https://www.washingtonexaminer.com/cigarette-maker-lorillard-bans-animal-testing>

regulations in the future. Other companies, such as Imperial Brands¹²⁴ and British American Tobacco,¹²⁵ have since made similar commitments.

What You Can Do

Tell the Center for Tobacco Products (CTP) to follow the lead of other countries by banning tobacco product and ingredient tests on animals.

FDA Center for Tobacco Products (CTP)

E-mail: AskCTP@fda.hhs.gov (mailto: AskCTP@fda.hhs.gov)

Twitter:	@FDATobacco	/https://twitter.com/FDATobacco
(https://twitter.com/FDATobacco)	Facebook:	https://www.facebook.com/FDA
(https://www.facebook.com/FDA)		

References and Footnotes

1 Wallonian Government (Belgium). *Animal Welfare in Wallonia*. Article D.66. 7. Accessed December 22, 2021.

<http://bienetreanimal.wallonie.be/home/legislation/legislationlist/liste-de-legislations-bea/bienetre067-W.html>

2 Parve V, Glasa J. *National Regulations on Ethics and Research in Estonia*. European Commission; 2004.

<https://op.europa.eu/en/publication-detail/-/publication/4510a49f-3151-4e1b-8dad-91c0672620b5>

3 Government of Germany. *Animal Welfare Act*. §7a(4). Accessed December 22, 2021. <https://www.gesetze-im-internet.de/tierschg/BJNR012770972.html>

4 Glasa J, *National Regulations on Ethics and Research in Slovak Republic*. European Commission; 2004.

5 Home Office. *Guidance on the Operation of the Animals (Scientific Procedures) Act 1986*. Chapter 5.

6 Zhu L, Di PYP, Wu R, Pinkerton KE, Chen, Y. “Repression of CC16 by cigarette smoke (CS) exposure.” *PLoS One* 10, no 1(2015):e0116159.

7 Bernard A, Marchandise FX, Depelchin S, Lauwerys R, Sibille Y. “Clara cell protein in serum and bronchoalveolar lavage.” *Eur Respir J*. 5, no. 10 (1992):1231-1238. Accessed December 22, 2021. <https://pubmed.ncbi.nlm.nih.gov/1486970/>

Originally published on PETA’s website: <https://www.peta.org/issues/animals-used-for-experimentation/animals-used-experimentation-factsheets/smoking-experiments-animals/>

¹²⁴

See

<https://www.imperialbrandspc.com/media/our-views.html#:~:text=Product%20testing,or%20by%20recognised%20regulatory%20authorities>

¹²⁵ See <https://www.bat.com/r%26d>

Deconstructing Myths Surrounding Veganism & People of Color

by Sarambi

MYTH: Veganism is a white privileged consumer activity.

Aight, so I hear this and see this shit a lot. That vegans are inherently white, that veganism is about consumerism, and it also makes the (racist) assumption that ALL POC people have the same, monolithic culture around consuming and exploiting animals. Does the average Western vegan have access to expensive, fancy options? Yes, but so do all consumers, especially those who prefer “natural”, “happy”, “healthy”, and “organic” animal products. And when you don’t? Well, you’re getting by on what is affordable, calorie dense, nutritionally balanced as much as feasible, kinda like we all do when we are forced into poverty. It ain’t new that food and class go together—it literally has been like this since hierarchies and the foundation of many stratified societies that your “worth” is translated to diet. Anyway, there is also the wide array of class backgrounds within the vegan POC community, though most, as you can guess cuz society, are making far less than the Western white vegan trope. And they’re doing fine as they are acting in resistance to consumerism pushing the racist settler narrative that all POC eat a certain way and always have. No, we are and always have been has varied and different as the plant and animal nations. Don’t be lazily keeping a narrative that white people gave you to separate our relationship to plants and animals.

MYTH: Veganism is a form of colonialism because anti-speciesism is a Western concept.

Hang on, so Western Europeans roll up on all our lands, say its theirs cuz flags, enslave/“reform”/kill us, and start desolating land which kills and hurts our relations for centuries and being against that destruction of other living nonhuman relations is theirs? It’s their concept insomuch as they have actively created speciesism we all know of today. The understanding my people have had about nonhuman animals is that they are no different than humans, they share the fact that they are protected by spirits as we are, or they themselves are important figures or representatives to things beyond our own perceptual world. The respect and realization of the fact we are no different than other animals, and we are related and should be treated as such has been a very indigenous understanding as we understand it for the land and waters too. Colonizers have mostly successfully broken these connections and understandings by force on purpose, and have

turned all facets of the land, water, and living beings into property instead of honored and related dynamic lives. So actually your speciesism is colonial as fuck.

MYTH: Animal liberation isn't revolutionary and has nothing to do with anarchy.

How is disrupting one of the largest exploitative, capitalist, racist, colonial systems not qualify as revolutionary? Please read the history and the Animal Enterprise Terrorism Act in full and then talk to me how it's a non issue to attack. Just like how reforms and social justice ain't gonna get us total freedom, veganism alone as western green consumerism ain't gonna do shit either. Which is why green anarchists, anti-civ types, and generally very militant folx have been on some of the most destructive, economically and psychologically damaging attacks done. Where I primarily grew up here in the PNW a large, profitable luxury fur trade was shut down because of attacks by folx on some anticapitalist, anticolonial, antispeciesist shit. This is the type of terror authoritarians, capital, and protectors of these institutions need if we as people known colloquially as anarchists are gonna be the most effective at razing everything this type of society stands for.

MYTH: There is nothing wrong with hunting- indigenous people did it for years.

Are you indigenous? Like actually raised in, knowledgeable about your peoples, accepted by said peoples and not basing it off blood quantum alone? No? Please fall back then cuz no. If yes, *mba'éichapa! Ha upei?* We gotta talk, cool? Cool, so about hunting. Hunting made hella sense within a certain time. Now thanks to the colonization of our ancestral areas, the genocides between us as indigenous peoples and our ancestral land, water, and yes nonhuman animals are linked thanks to settler-colonial capitalism. We don't got time to be killing our relations now! Also, c'mon, look at how these traditions got polluted by settlers, wiping out bison and many now extinct species especially from the eastern areas, destroying orca, seal, salmon, eagle, coyote, wolf, etc., etc. and that's just in colonially identified North America. Let's stop giving them ideas and start respecting life enough for it to balance and thrive once again.

MYTH: Pre-colonial Native diets were primarily animal based.

Oh hey, more racist settler-colonial stereotypes homogenizing billions of people who have lived and peoples who survive. Ok so evidence and living indigenous people who carry on traditional living know that none of our diets were identical, it was based on

what is available. So case in point, I don't expect the tribes in the northern Plains to have the same berries, citrus, and vegetation as my people do in the sub-Amazon. However, it is also very telling that in many cultures and structures the meat eating was a rare thing saved for the elite primarily on special occasions. Dietary research has been being done for example with mummies and corpses in the mountains of the Andes and Patagonia showing that everyday people were eating primarily vegetables and starches and wearing plant based materials. This carries over to even North America, with Eastern tribes subsisting on the vast variety of gourds, nuts, fruits, and plant matter over game. Sure, this might not carry over to all tribes but like I said, we are not a monolithic people as the colonizers want us to believe we are.

MYTH: Veganism is a classist movement because vegan food is expensive and unattainable in poor communities.

Remember what I was saying earlier about consumerism in all forms being classist at the beginning? And the connection to elites having the access to flesh in major aboriginal empires above here? So again, vegan food has been around and been affordable. Any vegetarian food from certain non-Western traditions (looking at East, SE, South Asian, Middle Eastern, East African, and yeah, Latin and indigenous foods) are based on only cheap ingredients like legumes, rice, a wide assortment of common and uncommon vegetables and starches, and things like tofu, hella fruits, glutinous items, and fungi as well as things like flatbreads, noodles, cakes of glutinous and starchy goodness. Thing is, these things are cheap, filling (if you never have had to live off the staple *arroz y frijoles* cuz the paycheck ran dry, c'mon), and more nutritionally packed for the caloric intake than animal products. A healthier, plant-based diet and decolonial diets have shown success at combating illnesses that are primarily affecting POC and poor communities in the West such as heart disease, diabetes type II, hypertension, and GI disorders as well as maintaining good health in chronic illnesses along with physical activity. Saving money on not needing to pay or be chased by medical bills sounds pretty good. WE don't need fancy ass shit to be vegan, cuz we have had these things and the knowledge all along! This society has tried to rip us apart or make us do that work for it, so fight in any way by any means.

MYTH: Hunting and gathering is a form of anti-colonial resistance, therefore veganism can not be a form of anti-colonization.

Hunting was still not a focal point of the vast majority of indigenous people unless there was no other options (e.g., Artic/far north, pacific island folx, some desert dwellers). The great hunter gatherer ideas are colonially based usually around the time where romanticism of indigenous people was the hip thing. **Part of decolonization and**

rebalancing of our relation to the animal nations will need to involve us adjusting as we are at an ecological breaking point where many of us can't hunt or even grow food cuz of destruction. It's unfortunate but our ancestors did not have an environment of 523 years of misuse, poisoning, senseless hunting/mass extinction (particularly for my lands as the Amazon and sub-Amazon forest have been gutted from how it was thriving), insert most other things colonizers are still doing. My peoples have an understanding of protectorates and spirits for everything, and I personally have taken to respecting the survival and existence of the lives and their spirits as a defiance to the evil spirits of the foreign occupiers. We all have refused to die so far. Many folx still also do hunt like outsiders, as I've seen here related to fishing which is precarious due to over fishing (thx whites), damming, and water degradation from leisure and outsiders as I've seen here related to fishing which is precarious due to over fishing (thx whites), damming, and water degradation from leisure and agricultural sources. Some folx aren't fishing out here anymore cuz of the need to restore and defend. It's a complicated balance that we as people of this continental land need to be on the forefront of because of how dramatically it has affected us. And to defend, preserve, and protect right now as means doing the same for our nonhuman relations. TLDR: blame white people for killing the planet cuz they ruined everything and now we gotta fix things or we're all doomed.

Published previously in: Sarambi, "My Vegan Straight Edge is Anything but White: An Indigenous Anarchist Critique of Speciesism and Intoxication Culture" Warzone Distro (2017). <https://warzonedistro.noblogs.org/post/2017/09/11/my-vegan-straight-edge-is-anything-but-white-an-indigenous-anarchist-critique-of-speciesism-and-intoxication-culture/>

6 Electrifying Addiction: Consumption, Cell Phones, and Computers

Addictive Economies and Coal Dependency: Methods of Extraction and Socioeconomic Outcomes in West Virginia, 1997-2009

by Robert Todd Perdue and Gregory Pavela

Does resource extraction benefit local communities? Twenty years ago, William Freudenburg (1992) addressed this misleadingly simple question and concluded it depended largely on the time frame employed. In the short term, communities are likely to benefit from increased employment and capital investment, the so-called “shot in the arm,” but in the long run such communities tended to fare worse than those independent from resource extraction. This led Freudenburg to compare the short-term logic of policy makers with that of drug addicts and to label these Faustian arrangements “addictive economies.” Freudenburg called for longitudinal research that could shed light on the human-capital implications of these economies and determine how and why outcomes varied across regions and industries. A decade later, Freudenburg and Wilson (2002) noted an increase in such studies but concluded that “while the overall body of literature addressing the economic well-being of mining-dependent areas is vast, the number of studies explicitly offering systematic, quantitative data on the impacts of mining in the rural United States is actually much smaller” (p. 554).

Yet another decade has passed, and these socioeconomic relationships are still murky. Clarification is important because the empirically questionable belief that resource extraction will be a boon for local economies and citizens is typically accepted without question in policy circles (Wilkinson, 1998). These decisions often result in degraded landscapes and communities, as the environmental justice literature illustrates (Gedicks, 2001). Empirical research assessing the impacts of coal extraction is more critical than ever in Appalachia, as the ecological impacts of the mountaintop removal (MTR) mining method are clear (Environmental Protection Agency [EPA], 2010). The MTR method of extraction uses explosives to remove up to 1,000 feet of mountaintop, which is then pushed into neighboring valleys to reveal coal seams. The result is similar to a landscape of plateaus, as more than 2,000 square miles of woodland have been deforested and more than 2,000 miles of Appalachian headwater streams buried in the past three decades (EPA, 2010).

Despite these significant ecological costs, little empirical evidence suggests that coal extraction tangibly benefits the people of the region, notwithstanding the claims of proindustry supporters that coal is the lifeblood of Central Appalachia (Bell & York, 2010). In this article, we examine the impacts of coal extraction over a 13-year time period in West Virginia, the second-leading producer of coal in the United States and its number-one producer of underground coal. As such, West Virginia is a useful case for evaluating the relationship between extraction and socioeconomic outcomes on the short and longer timescales. West Virginia also permits examination of a key aspect of resource extraction that has received little empirical attention: the potential differential effects of methods of extraction on socioeconomic outcomes. Using a fixed effects model, we analyze the association between poverty, per capita income, and unemployment rates with coal production and method of coal extraction, either surface or underground, in West Virginia counties from 1997 to 2009. Our findings call into question the widely touted claim that coal adds to community well-being in the state of West Virginia, for coal may very well “keep the lights on,” but our findings suggest that ending dependence on coal regardless of extraction modality would likely prove more beneficial to the state’s economy and people.

Resource Dependence and Socioeconomic Well-Being

The political economy of Andre Gunder Frank (1967) grounds many debates of the costs and benefits of resource extraction, both internationally and domestically. Frank pointed out that peripheral nations economically enmeshed with core nations did not develop in the ways modernization scholars predicted but rather were “underdeveloped.” . . . The paradoxical presence of extensive poverty in the presence of great resource wealth became crystallized as the “resource curse” and stimulated numerous other studies attempting to unpack these complex dynamics on the international level (Bebbington, Hinojosa, Bebbington, Burneo, & Warnaars, 2008; Rajan, 2011; Ross, 2003; Sachs & Warner, 1995; Stedman, Parkins, & Beckley, 2004; Tonts, Plummer, & Lawrie, 2012). .

The Gallup-Healthways Well-Being Index ranked West Virginia 50th (last) out of 50 states in “Physical Health,” “Emotional Health,” “Life Evaluation,” and “Overall Well-Being” for the years 2009 and 2010. In addition, Freudenburg’s drug metaphor seems most apt given that the coalfields are currently awash in prescription drug abuse (Kobak, 2012).

Only recently have researchers attempted to differentiate social outcomes by mining type, however, notably by differentiating MTR areas from underground mining operations. Such research has documented negative health outcomes in MTR areas, including the study by Ahern et al. (2011) which found higher rates of birth defects and premature death from respiratory, heart, and kidney diseases near MTR sites. Hendryx and Zullig (2009) found higher rates of cardiovascular disease, angina, and heart attacks for both men and women living near MTR sites. Hendryx (2011) documented higher mortality rates but, importantly, also included socioeconomic variables, finding higher total poverty and child poverty rates in MTR areas. Although these studies are exceedingly valuable, more longitudinal work is needed to validate the above-mentioned findings. To this end, we seek answers to two main questions: (a) Do communities with coal extraction have better socioeconomic outcomes than other communities? (b) Among coal-extraction communities, do those relying on underground mining methods have

better outcomes than those where surface mining dominates? We use the case of West Virginia to answer these questions.

The Case: West Virginia and Coal

Like all coal-dependent states in the Appalachian region, West Virginia rode the “resource roller coaster” during the 20th century (Wilson, 2004). As demand for Appalachian coal dwindled in the interwar years, the formerly thriving coal industry went bust, and the Great Depression was especially painful in the region. With World War II and the war effort, however, the region was catapulted into a boom time. Recognizing the key role played by coal, the U.S. government took control of coal operations during World War II to ensure an uninterrupted flow of the fuel (Couto, 1993), and miners suddenly became coveted. . . .

The federal government made labor-friendly deals with John L. Lewis and the United Mine Workers, resulting in a strong union, generous wages, and high times in the mountains (McGinley, 2004).

But as quickly as the boom had begun, it deflated as the war effort ended. The coal operators resumed control of the nationalized mines and accelerated production, resulting in a glutted market (McGinley, 2004). At the same time, domestic coal demand decreased as homeowners across the nation switched from coal to cleaner-burning oil for their heat, while the railroads shifted to diesel power. As Thomas notes, “the disruption or disappearance of traditional coal markets led to falling coal production, narrower profit margins, and discharge notices for growing numbers of miners as coal operators mechanized to reduce labor costs” (2010, p. 12). Indeed, mechanization processes only accelerated following the war, as McGinley points out: “In 1948, 117,104 miners were at work in West Virginia. In 1957, only 58,732 miners had jobs, and by 1961 employment of miners had shrunk to only 42,557 in West Virginia” (2004, p. 34).

Mechanization altered both surface and underground mining operations. On the surface, the economies of scales created by massive power shovels, bulldozers, dump trucks, and train cars greatly increased efficiency and reduced the need for human labor, while simultaneously increasing coal-extraction rates. Nevertheless, underground mining still accounted for 75% of all mining in 1950 (Bonskowski, Watson, & Freme, 2006), and the subterranean technological developments were every bit as dramatic as those on the surface, forever altering the work and health of deep miners. The continuous mining machine introduced by the Joy Manufacturing Company in 1948 automated the mines and virtually eliminated the need for hand loaders, dramatically reducing extraction costs (Thomas, 2010, p. 13). In terms of health outcomes, the number of mining fatalities decreased during the increasingly mechanized postwar period, but injury rates increased due to the accelerated work pace and the increased noise of the job site (Thomas, 2010). But the most insidious danger of mechanization was created by the continual sawing and release of fine coal dust, and pneumoconiosis, black lung disease, soon emerged as an eminent health threat to miners.

Nevertheless, those with jobs were grateful for them, as newly out-of-work miners and their families had tough decisions to make. Thousands reluctantly left the mountains in search of work in Detroit, Akron, Cincinnati, Cleveland, and other industrial hubs in what became known as the Great Migration (Berry, 2000). As Rice and Brown note, “Between 1950 and 1960 the population of West Virginia declined from 2,005,552 to

1,860,421, a loss in excess of seven percent at a time when nearly every other state gained population. More than seventy percent of the loss occurred in the ten leading mining counties” (1993, p. 280). At the same time, the landscape underwent dramatic changes as denuded mining sites replaced many family farms. In addition to the loss of jobs and environmental degradation, broad-form mining deeds challenged that seminal hallmark of American capitalism, private property. Such deeds granted mining companies the mineral rights beneath the surface, allowing these companies to surface mine land under color of law.

The 1970s saw a continuation of the boom/bust cycle of the coal industry. The pain inflicted by skyrocketing oil prices reinvigorated interest in coal as a fuel source, and a short-lived boom ensued. Many of the shuttered company towns of Appalachia again sprang to life. . . .

But this time . . . the boom in the coalfields lasted but a few years. The 1980s saw the region entering into yet another bust phase as a consequence of the recession of the early Reagan years and the economic restructuring away from manufacturing toward service and information sectors. More than 1,600 West Virginian mines closed at this time, while the number of miners declined by half from 1980 to 1990 (Latimer & Mencken, 2003, p. 81), and by 1984 West Virginia led the nation in unemployment (Rice & Brown, 1993). . . .

Amendments to the Clean Air Act in 1990, specifically limits on sulfur dioxide emissions from burning coal, resulted in yet more upheaval in the coal industry. Utility companies, major emitters of sulfur dioxide, were left with two options: they could install expensive retrofits to their plants to reduce these emissions, or they could burn coal with less sulfur (Faber, 1998).

These legislative acts made the high-sulfur mines of the Midwest much less desirable, evidenced by the shuttering of more than 1,000 high-sulfur mines (Faber, 1998, p. 45). In this context, the low-sulfur coal deposits in Appalachia became more attractive to utilities, and 1997 (the first year of this study) witnessed the greatest total production recorded in West Virginia history, with about 180 million tons of coal extracted, roughly a third coming from surface operations (WVOMHST, n.d.-a). The use of MTR methods accelerated greatly at this time, expanding from about 77,000 acres in 1985 to 272,000 acres under MTR in 2005 (Skytruth, 2009). Indeed, MTR has come to be the dominant type of surface mining, as 43 million of the 56 million tons of West Virginia coal extracted from the surface in 2009 came from MTR mines (WVOMHST, n.d.- b). While underground mining still dominates in West Virginia, production rates have declined steadily since the production high point of 1997. Conversely, surface-mined coal has increased at roughly the same rate that underground mining has declined since this time.

These data show a clear shift in the way that coal is pulled from the ground in West Virginia. It is still unclear, however, if these methods of extraction matter for socioeconomic outcomes or if coal extraction in general is associated with better socioeconomic outcomes for West Virginians. To shed more light on how coal dependency affects the people of West Virginia, we correlate available coal data broken down by county and extraction type from 1997 through 2009 with numerous socioeconomic indicators.

Data

Our analysis includes data from all of West Virginia's 55 counties over a 13-year observation period from 1997 to 2009. Unemployment data come from the Bureau of Labor Statistics, poverty data come from the U.S. Census Small Area Income and Poverty Estimates (SAIPE data set), and per capita income data come from the Bureau of Economic Analysis. Coal-mining data come from the West Virginia Office of Miners' Health Safety and Training, which includes underground and surface totals of short tons of coal produced and employment in the sector at the county level.

Method

For each outcome of interest (poverty, per capita income, unemployment), we estimated a fixed effects regression using the mean deviation algorithm procedure. In our analysis, the mean deviation method computes means over time for each county and each time-varying variable. County-specific means are then subtracted from the observed values of each variable, and the differences for the dependent variable are regressed on the differences of the independent variables (Allison, 2009). The model was estimated using the "xtscc" procedure in STATA 12 as follows:

$$Y(it) = \beta X(it) + \alpha(i) + u(it),$$

where subscript i indicates entity and subscript t indicates time, α is the unknown intercept, $Y(it)$ is the dependent measure for county i at time t , β is the coefficient for the vector of the set of time-varying variables included in the model, and $u(it)$ is the error term for observation i at time t .

Dependent Variables

We estimate three models, one for each outcome of interest: county-level unemployment percentage, county poverty percentage, and county-level per capita income in constant 2009 dollars deflated using the consumer price index. County-level unemployment is defined as the percentage of individuals who do not have a job, made at least one attempt to find a job in the past month, and were available for work (U.S. Department of Labor, Bureau of Labor Statistics, 2012). County poverty estimates come from the SAIPE program. The SAIPE program uses administrative records, intercensal population estimates, and the decennial census with direct estimates from the American Community Survey "to provide consistent and reliable single-year estimates of poverty" (U.S. Census Bureau, n.d.). County-level per capita income estimates come from the Regional Income Division of the Bureau of Economic Analysis (U.S. Department of Commerce, 2011). Per capita personal income is calculated as the personal income of the residents of a given area divided by the total resident population of that area using the Census Bureau's annual midyear population estimates as the area population estimate (U.S. Census Bureau, n.d.).

Independent Variables

Independent variables included in the analyses are total coal tonnage produced within a county, tonnage of coal produced from underground mines as a percentage of total West Virginia underground production, tonnage of coal produced from surface mines as a

percentage of total West Virginia surface production, a dichotomous indicator of either none or any mining activity (surface or underground) in a county, percentage of employment within a county in the mining sector, and an indicator for a linear effect of time. All these data are derived from WVOMHST. In addition, we included the price of underground West Virginia coal relative to the national average price of underground coal and the cost of West Virginia surface coal relative to the national average price of surface coal in constant 2009 dollars. These data come from the Annual Coal Report released by the Energy Information Administration (EIA, 2011). Finally, we include annual population estimates from the U.S. Census Bureau as a covariate.

Results

Average poverty across all observed counties and time periods is 17.87%. Mean per capita income was \$26,249 and average unemployment was 6.43%. Approximately half of the counties had mining activity, with an average 2.975 million tons of coal produced per county over the 13-year observation period. Each mining county accounted for an average of 1.8% of all underground coal produced in West Virginia and 1.8% of all surface coal produced in West Virginia. Within each county, an average of 2.9% of all workers found employment in the mining sector. West Virginia underground coal was, on average, \$7.65 more expensive than the average national price of underground coal, while surface coal was, on average, \$32 more expensive than the average national price of surface coal.

Table 17.2 reports the results from the analysis estimating county-level poverty. Significant predictors of poverty include the presence of any mining activity in a county, the percentage of West Virginia underground coal produced within a county, and the relative market cost of West Virginia surface coal. Counties with no mining activity are expected to have lower poverty rates than counties with mining activity ($b = -0.64$, $p < .01$). Counties that produce a higher percentage of West Virginia's underground coal are expected to have slightly higher rates of poverty ($b = 0.11$, $p < .05$), and poverty is also expected to increase as the market cost of West Virginia surface coal increases ($b = 0.08$, $p < .10$).

Table 17.3 presents the results from the analysis estimating county-level per capita income. The relative market price of West Virginia surface coal is significantly associated with per capita income. As the market price of surface coal increases, county per capita income is expected to decrease ($b = -64.32$, $p < .01$). The indicator of a linear time effect was also significant—across all time points, per capita income increased by an average of \$567.35 ($p < .01$). Table 17.4 reports the results from the analysis estimating county-level unemployment.

The presence of mining activity, the percentage of West Virginia underground coal produced within a county, and the relative market cost of surface coal are significantly associated with unemployment. Counties with no mining activity are expected to have lower unemployment levels ($b = -0.55$, $p < .05$). Unemployment is also expected to decrease as the relative market cost of surface coal increases ($b = -0.17$, $p < .05$). However, the percentage of West Virginia underground coal produced within a county is associated with higher unemployment—for each percentage increase in a county's contribution to West Virginia's total underground coal production, we expect a 0.16% increase in unemployment levels ($p < .10$).

Discussion

We found that West Virginia counties with no coal mining have lower levels of poverty than mining counties. Moreover, counties that mine a higher percentage of underground coal relative to other counties have higher levels of poverty. These findings support much of the “resource curse” literature, which contends that dependency on natural resources results in stifled development and negative socioeconomic outcomes. This is due in large part to the fact that coal extraction is a primary industry; coal is pulled from the ground, cleaned, and shipped away. Therefore, little opportunity exists for these operations to be economically “linked” to secondary industries which process and transform raw materials into value-added finished products, such as refineries for oil (Freudenburg & Gramling, 1998) or paper plants and sawmills for forest products (Overdevest & Green, 1995). The very nature of the resource and the “fixity of extraction” require coal to be transported large distances to utilities and factories, reinforcing its peripheral nature (Bunker, 1985). Moreover, access to local markets ended after most Appalachian homeowners switched to oil and the railroads shifted to diesel-powered engines. These circumstances prevent coalfield communities and businesses from exploiting the processing and services which provide high-wage specialized jobs and additional tax revenue. As such, it is not surprising that coal-dependent counties have higher rates of poverty than nonmining counties, as little potential for capitalization of the resource exists.

The jobs found in the coal industry, however, are typically thought of as “good jobs” with relatively high pay, especially considering the low cost of living in the coal-bearing regions of the state. It is not, then, low wages paid to miners that contribute to the higher rates of poverty in coal-mining counties but rather the sheer lack of opportunity. Mechanization of both underground and surface mines has dramatically reduced the number of jobs available to coalfield communities, for as Williams (2002, pp. 345–346) points out, more West Virginians work at Wal-Mart than in the mines. . . . Indeed, the increased capitalization and modest demand for labor in coal operations calls into question the assertion made by the coal industry and its supporters that coal is the lifeblood of the region. As Bell and York (2010, p. 121) point out, although West Virginia is the leading producer of coal in the region, coal contributed only 7% to the gross state product in 2004. This highlights the minor economic benefits of the industry, while others suggest that if the hidden costs of coal were internalized, coal would actually be a net loss for coal-state economies (McIlmoil, Hansen, Boettner, & Miller, 2010).

We argue that our second main finding, that as the relative market price of West Virginia surface coal increases, poverty increases while per capita income decreases, is due to several factors which make up what Freudenburg (1992) called the “cost/price squeeze.” In essence, higher coal prices do not necessarily imply higher profits but instead signify a less attractive option for coal purchasers. In West Virginia, the main factors creating this cost/price squeeze are (a) depletion of productive and easily accessible reserves, (b) competition from cheaper western coal, (c) increased competition from other energy sources, especially natural gas, and (d) tightening environmental regulations. These factors have increased the costs of coal production while reducing the price West Virginia coal can fetch, resulting in shrinking margins.

The most obvious of these factors is the exhaustion of productive and easily accessible reserves. Coal has been mined in West Virginia for hundreds of years, and operators began mining in the most rewarding locations. Unlike the much newer mining operations in the Powder River Basin of Wyoming and Montana, where coal is close to

the surface and seams can reach 100 feet deep, Appalachian coal operators are forced to spend greater sums to reach and extract relatively thin seams of coal. Indeed, more coal is extracted from Wyoming mines than from all of Appalachia combined (EIA, 2011).

Another crucial factor lessening the viability of West Virginian coal, both surface and underground, is the explosion of natural gas drilling and use. New methods of extraction, such as hydraulic fracturing, have opened new vistas to the natural gas industry. Coupled with extensive reserves in many regions of the country (including Appalachia), the price of natural gas has dropped precipitously in the past few years, pushing coal out of many markets as its cost drops close to that of coal. . . .

When increased regulation and pollution-control costs are factored into the equation, coal is even less attractive for utilities. Despite a recent ruling by U.S. District Judge Amy Berman Jackson which restricted the authority of the EPA to withdraw Clean Water Act permits, allowing the largest ever MTR mining operation to go forward, the EPA has placed other significant obstacles in the path of the coal industry. Recently, the EPA proposed the first Clean Air Act standard for carbon emissions for future power plants, imposing much stricter allowances of CO₂ emissions and forcing new coal-burning plants to capture a large portion of their pollution (EPA, 2012). Meeting these standards will be much easier for power plants using cleaner-burning natural gas, and coal's primacy as America's electricity provider is now in doubt. As the president of Duke Energy (one of the largest consumers of coal in the United States), Jim Roger, concludes, "As we look out over the next two decades, we do not plan to build another coal plant" (National Public Radio, 2012). In addition to these new standards, utilities are facing tighter restrictions on the disposal of coal ash at their facilities following the catastrophic damage of the failure of the TVA Kingston Fossil Plant's slurry lagoon in December 2008. Finally, as the reality of climate change is less easy to deny, regulations regarding the release of greenhouse gases will likely tighten further, a reality that utilities are undoubtedly factoring into their business models.

The above-mentioned factors have resulted in higher prices for West Virginia coal, which have in turn made it less competitive compared with coal mined from other regions and states. . . . Although the coal mined in West Virginia is of higher quality than that found almost anywhere else in the nation, its premium price coupled with the increasingly competitive nature of natural gas is making it a less attractive option for energy providers. Indeed, those conglomerates heavily invested in the region are experiencing difficulties, evidenced by the bankruptcy filing of Patriot Coal, the third-largest producer of MTR coal, in July 2012.

Finally, our model predicting unemployment suggests that differing extraction methods exert slightly different impacts in this realm. Indeed, the relationship between underground coal mining and unemployment is somewhat counterintuitive: Counties that produce a higher percentage of underground coal are expected to have higher levels of unemployment. As underground mines require more human labor than those on the surface, it would seem that employment should increase as more coal is produced. However, in many ways, underground mining has become as mechanized as that on the surface, and increased production does not necessarily mean more human laborers are required. In addition, counties with high levels of underground mining typically have longer legacies of mining, which, as these findings suggest, creates dependency and stifles the development of other opportunities for employment.

The high costs of developing, maintaining, and expanding underground operations will likely push coal operators to extract more coal from the surface. This will continue a trend, evidenced by the steady decrease in underground production since 1997 and the halving of underground employment in the past three decades; in 1983, more than 26,000 miners were employed in the underground mining sector, while barely 13,000 found work in 2010 (Mine Safety and Health Administration, n.d.). Underground mines are the first to cut back on production and employment and to be shuttered by coal operators during bust cycles. For instance, in February 2012, Alpha Natural Resources announced plans to make cuts due to decreased demand. The company reduced worker hours at several surface mines, but two underground mines were completely shut down, resulting in the layoff of 320 workers (Ward, 2012). Such outcomes are likely to continue given the bleak future of the Appalachian coal industry, for as McIlmoil *et al.* (2010, p. 9) project, coal production in Central Appalachia faces a decline from 234 million tons in 2008 to 99 million tons by 2035. ...This represents a decline of 58% over the next 25 years, with the greatest share of the decline occurring in the next decade. As such, a replication of this study in another decade may yield very different results. For now, our findings make clear that transitioning away from coal dependence, regardless of extraction method, will benefit both the land and the people of West Virginia.

Conclusion

As Freudenburg (1992) pointed out, the temporal scale employed is critically important in natural resource decision making. Our analysis contributes to these understandings by analyzing the relationship between coal extraction and community well-being in West Virginia during a period when rates of surface mining increased and underground mining decreased. We find little difference in socioeconomic outcomes between surface and underground mining but, rather, find that it is the presence or absence of mining that matters most. These findings call into question the argument that coal extraction is beneficial for citizens of the Mountain State, as counties that do not extract coal have lower rates of poverty than extracting counties, while poverty increases in mining counties as relative extraction rates increase. Moreover, coal-mining counties do not have higher per capita income or employment than non-mining counties. In addition, we find that as the relative market price of West Virginia surface coal increases, so too does poverty, a phenomenon explained by the “cost/price squeeze.” Given the negative socioeconomic ramifications of coal mining and the price squeeze on Appalachian coal, it seems that a radical restructuring of the West Virginian economy is in order before resource exhaustion. Indeed, it seems that the state would be better off capitalizing on other natural resources, namely its scenic beauty and economically viable wind power, while conserving its ancient ecosystems. Leaving remaining coal in the ground will likely prove the best alternative in the long run for West Virginians, as the opportunities to capitalize on renewable and, therefore, perpetual economic development are great.

That said, it is still uncertain how generalizable these findings are to other regions and resources. Future research examining if and how extraction method matters in diverse contexts is needed, especially on the international scale. Our findings suggest that the method of extraction is less important than the capital intensity of production, supporting the main thesis of dependency theorists, as well as that of the treadmill of production school (see Schnaiberg, 1980). The rapid acceleration of mechanization in both underground and surface mines following World War II, the concomitant production increases, and the demise of organized labor heightened the region’s dependency on coal.

This dependency has resulted in dire socioeconomic outcomes in West Virginia that are similar to those found in other peripheries. Opportunities exist, however, for alternative economic pathways to be constructed as coal's viability diminishes, but increased scrutiny of the relationships between local elites and outside capital is also necessary. Finally, communities contemplating or currently taking part in the natural gas boom should consider the outcomes found in the coalfields of West Virginia, for as Pellow notes, "the domination over people is reinforced and made possible by the domination of ecosystems" (2011, p. 247). In this light, the relationship between resource addiction and the pain of withdrawal becomes all too clear.

References

- Ahern, M. M., Hendryx, M., Conley, J., Fedorko, E., Ducatman, A., & Zullig, K. J. (2011). The association between mountaintop mining and birth defects among live births in Central Appalachia, 1996–2003. *Environmental Research*, 111, 838–846.
- Allison, P. D. (2009). *Fixed effects regression models*. Thousand Oaks, CA: Sage.
- Bebbington, A., Hinojosa, L., Bebbington, D. H., Burneo, M. L., & Warnaars, X. (2008). Contention and ambiguity: Mining and the possibilities of development. *Development and Change*, 39, 887–914.
- Bell, S. E., & York, R. (2010). Community economic identity: The coal industry and ideology construction in West Virginia. *Rural Sociology*, 75, 113–143.
- Berry, C. (2000). *Southern migrants, northern exiles*. Urbana: University of Illinois Press.
- Bonskowski, R., Watson, W., & Freme, F. (2006, October). *Coal production in the United States: An historical overview* (Energy Information Administration). Retrieved from ftp://ftp.eia.doe.gov/coal/coal_production_review.pdf.
- Bunker, S. G. (1985). *Underdeveloping the Amazon: Extraction, unequal exchange, and the failure of the modern state*. Urbana: University of Illinois Press.
- Couto, R. A. (1993). The memory of miners and the conscience of capital: Coal miners' strikes as free spaces. In S. L. Fisher (Ed.), *Fighting back in Appalachia: Traditions of resistance and change* (pp. 165–194). Philadelphia: Temple University Press.
- Energy Information Administration (EIA). (2011, November 30). *Annual coal report*. Retrieved from <http://www.eia.gov/coal/annual/>.
- Environmental Protection Agency (EPA). (2010, April 1). EPA issues comprehensive guidance to protect Appalachian communities from harmful environmental impacts of mountaintop mining. Retrieved from <http://yosemite.epa.gov/opa/admpress.nsf/e77fdd4f5afd88a3852576b3005a604f/4145c96189a17239852576f8005867bd!OpenDocument>.
- Environmental Protection Agency (EPA). (2012, March 27). EPA proposes first carbon pollution standard for future power plants/Achievable standard is in line with investments already being made and will inform the building of new plants moving forward. Retrieved from <http://yosemite.epa.gov/opa/admpress.nsf/6427a6b7538955c585257359003f0230/9b4e8033d7e641d9852579ce005ae957!OpenDocument>.

- Faber, D. (1998). The political ecology of American capitalism: New challenges for the environmental justice movement. In D. Faber (Ed.), *The struggle for ecological democracy: Environmental justice movements in the United States* (pp. 27–59). New York: Guilford.
- Frank, A. G. (1967). *Capitalism and underdevelopment in Latin America*. New York: Monthly Review Press.
- Freudenburg, W. R. (1992). Addictive economies: Extractive industries and vulnerable localities in a changing world economy. *Rural Sociology*, 57, 305–332.
- Freudenburg, W. R., & Gramling, R. (1998). Linked to what? Economic linkages in an extractive economy. *Society & Natural Resources*, 11, 569–586.
- Freudenburg, W. R., & Wilson, L. (2002). Mining the data: Analyzing the economic implications of mining for nonmetropolitan regions. *Sociological Inquiry*, 72, 549–575.
- Gedicks, A. (2001). *Resource rebels: Native challenges to mining and oil companies*. Cambridge, MA: South End.
- Hendryx, M. (2011). Poverty and mortality disparities in Central Appalachia: Mountaintop mining and environmental justice. *Community Health*, 4 (3), 44–53.
- Hendryx, M., & Zullig, K. J. (2009). Higher coronary heart disease and heart attack morbidity in Appalachian coal mining regions. *Preventive Medicine*, 49, 355–359.
- Kobak, S. E. (2012). OxyContin flood in the coalfields: “Searching for higher ground.” In S. L. Fisher & B. E. Smith (Eds.), *Transforming places: Lessons from Appalachia* (pp. 198–209). Urbana: University of Illinois Press.
- Latimer, M., & Mencken, F. C. (2003). Socioeconomic trends in mining-dependent counties in Appalachia. In W. W. Falk, M. D. Schulman, & A. R. Tickamyer (Eds.), *Communities of work: Rural restructuring in local and global contexts* (pp. 79–103). Athens: Ohio University Press.
- McGinley, P. C. (2004). From pick and shovel to mountaintop removal: Environmental injustice in the Appalachian coalfields. *Environmental Law*, 34, 21–106.
- McIlmoil, R., Hansen, E., Boettner, T., & Miller, P. (2010, June 22). The impact of coal on the West Virginia state budget. Morgantown: Downstream Strategies and West Virginia Center on Budget & Policy.
- Mine Safety and Health Administration. (n.d.). Mining industry accident, injuries, employment, and production statistics and reports. Retrieved from <http://www.msha.gov/ACCINJ/accinj.htm>.
- National Public Radio. (2012, March 27). EPA plan targets new coal-fired plants. Retrieved from <http://www.npr.org/2012/03/27/149480756/new-epa-plan-targets-new-coal-fired-plants>.
- Overdevest, C., & Green, G. P. (1995). Forest dependence and community well-being: A segmented market approach. *Society & Natural Resources*, 8, 111–131.
- Pellow, D. (2011). Politics by other greens: The importance of transnational environmental justice movement networks. In J. Carmin & J. Ageyman (Eds.), *Environmental inequalities beyond borders: Local perspectives on global injustices* (pp. 247–265). Cambridge, MA: MIT Press.
- Rajan, S. C. (2011). Poor little rich countries: Another look at the “resource curse.” *Environmental Politics*, 20, 617–632.

- Rice, O. K., & Brown, S. W. (1993). *West Virginia: A history* (2nd ed.). Lexington: University Press of Kentucky.
- Ross, M. (2003). The natural resource curse: How wealth can make you poor. In I. Bannon & P. Collier (Eds.), *Natural resources and violent conflict: Options and actions* (pp. 17–42). Washington, DC: World Bank.
- Sachs, J., & Warner, A. (1995). *Natural resources and economic growth*. Cambridge, MA: Harvard Institute for International Development.
- Schnaiberg, A. (1980). *The environment: From surplus to scarcity*. New York: Oxford University Press.
- Skytruth. (2009, December 1). Mountaintop removal mining: Part 1. Measuring the extent of mountaintop removal in Appalachia. Retrieved from <http://blog.skytruth.org/2009/12/measuring-mountaintopremoval-mining-in.html>.
- Stedman, R. C., Parkins, J. R., & Beckley, T. M. (2004). Resource dependence and community well-being in rural Canada. *Rural Sociology*, 69, 213–234.
- Thomas, J. B. (2010). *An Appalachian reawakening: West Virginia and the perils of the New Machine Age, 1945–1972*. Morgantown: West Virginia University Press.
- Tonts, M., Plummer, P., & Lawrie, M. (2012). Socio-economic well-being in Australian mining towns: A comparative analysis. *Journal of Rural Studies*, 28, 288–301.
- U.S. Census Bureau. (n.d.). Model-based small area income & poverty estimates (SAIPE) for school districts, counties, and states. Retrieved from <http://www.census.gov/did/www/saipe/>.
- U.S. Department of Commerce. (2011, April). Local area personal income and employment methodology. Retrieved from <http://www.bea.gov/regional/pdf/lapi2009.pdf#pagemode=bookmarks>.
- U.S. Department of Labor, Bureau of Labor Statistics. (2012). Labor force statistics from the current population survey. Retrieved from <http://www.bls.gov/cps/lfcharacteristics.htm#unemp>.
- Ward, K., Jr. (2012, February 3). Alpha, Patriot announce coal production cuts. *Charleston Gazette*. Retrieved from <http://wvgazette.com/News/201202030170>.
- West Virginia Office of Miners' Health Safety and Training (WVOMHST). (n.d.-a). A brief history of coal and safety enforcement in West Virginia. Retrieved from <http://www.wvminesafety.org/History.htm>.
- West Virginia Office of Miners' Health Safety and Training (WVOMHST). (n.d.-b). West Virginia coal mining facts. Retrieved from <http://www.wvminesafety.org/wvcoalfacts.htm>.
- Wilkinson, T. (1998). *Science under siege: The politicians' war on nature and truth*. Boulder, CO: Johnson.
- Williams, J. A. (2002). *Appalachia: A history*. Chapel Hill: University of North Carolina Press.
- Wilson, L. J. (2004). Riding the resource roller coaster: Understanding socioeconomic differences between mining communities. *Rural Sociology*, 69, 261–281.

For all Tables see, previously published: Perdue, Robert Todd, and Gregory Pavela. "Addictive economies and coal dependency: methods of extraction and socioeconomic outcomes in West Virginia, 1997-2009." *Organization & Environment* 25, no. 4 (2012): 368-384; and Perdue, Robert Todd & Gregory Pavela. "Addictive Economies and Coal Dependency." In: *The Environment in Anthropology-A Reader in Ecology, Culture, and Sustainable Living*. Nora Haenn, et al., (Eds.), 170-184. 2016.

<https://journals.sagepub.com/doi/pdf/10.1177/1086026612464767>

Internet Addiction: A Modern Societal Problem

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Abstract

Internet addiction is a recent phenomenon which describes a state where people become so involved in online behaviour to the detriment of other aspects of their lives. Treatment camps for young people have sprung up around in a bid to address this contemporary issue. This chapter examines the factors in Internet addiction, its definition, the complications which exist in the various diagnostic methods of successfully diagnosing Internet addiction and the criticism directed towards some of these diagnostic methods. We also examine which individuals are at risk of developing this condition. We look at positive diagnosis of the addiction and the resultant effects it has on an individual's family life, employment, social life and personal wellbeing before finally looking at possible methods and treatments that can be used in treating Internet addiction.

Introduction

While the 20th century proved to be the century which provided us with a time of great advances in both information and communication technologies the 21st century however is proving to be the age of the Internet as we enjoy access to vast amounts of information from all over the World and many different forums for communication. The Internet plays an integral part of our modern lives and as advances are continually being made in the world of information Technology (IT), it becomes substantially easier to access. As its uses continually increase, especially among the younger generation (Akin and Iskender, 2011), the Internet means that we no longer need to go searching for information but rather information arrives at our homes on a computer screen via the simple click of a computer key. The Internet provides a wealth of services at our fingertips, including online gaming, shopping, gambling communication with friends, social media sites as well as an abundance of information for research purposes and it enables businesses to carry out operations in the form of Electronic Commerce (e-commerce) (Hersh, 1999; Poon, 2000). These and many other services are all readily available through the very accessible Internet which can be accessed without leaving the comfort of our chair at home.

Most people make use of the Internet as a functional tool performing their day-to-day personal objectives which may include booking hotels or making airline reservations. However certain individuals experience an inability to control their Internet use resulting in distressful symptoms of psychological dependence (Brand *et al.* 2014). The limits however, to which many individuals are engaging with the Internet and its many functions such as a means for communication is a subject of much discussion, as the topic of Internet addiction (IA) continues to be the subject of much debate among researchers in mental health (Young, 2004). Despite the vast numbers of Internet users which exist the benefits of the Internet are reported to far outweigh the opposing consequences which result from extreme use such as Internet addiction which reportedly is not yet recognised by the ICD-10 (International classification of Diseases) or the DSM-IV which is the 4th

edition of the Diagnostic and Statistical Manual of Mental Disorders (Murali and George, 2007). Internet addiction is referred to in several different ways and the terms “Internet addiction disorder (IAD),” “Problematic Internet Use (PIU),” “Excessive Internet Use,” “Compulsive Internet Use,” “Pathological Internet Use,” and “Computer Addiction” have all been used to refer to the same notion which is that an individual gets so involved in their online use to such an extent that it leaves other areas of their lives neglected (Griffiths, 1998; Cash *et al.* 2012; Yan *et al.* 2014; Li *et al.* 2014).

The remainder of this chapter looks at what constitutes an addiction, the definition of Internet addiction, the complications which exist in the various diagnostic methods of successfully diagnosing Internet addiction, the criticism some of these diagnostic methods have taken and the effects of excessive Internet use by both students and employees. This chapter also highlights those individuals which are of increased risk of developing this condition including positive diagnosis of the addiction and the resultant effects it has on the individual’s family life, employment, social life and personal wellbeing before finally looking at possible methods and treatments that can be employed for treating Internet addiction.

Background

Even though the last 15 years has witnessed the number of Internet users increase by 1000% research into Internet addiction is however, still in its infancy (Kuss and Lopez-Fernandez, 2016). With the growth of the Internet over the last two decades the number of Internet users and individuals experiencing problems as they have lost control over their Internet use and experienced negative issues in their daily lives such as problems at work or school, has risen extensively (Brand *et al.* 2014). There are currently over three billion Internet users worldwide which accounts for 40% of the world’s population. The first billion was reached in 2005 as 2010 witnessed the second billion and the level reach three billion in 2014 as the growth in smartphones and other devices enables online and Internet connectivity (Zafar, 2016). A recent nationwide study in 11 European countries reported the occurrence of obsessive Internet users to range from 11.8% in Israel to 1.2% in Italy (Lai *et al.* 2013).

Internet addiction (IA) is typically defined as a condition where an individual has lost control of their Internet use and proceeds to use the Internet excessively to the point where he/she experiences problematic consequences which ultimately have a negative effect on his/her life (Kardefelt-Winther, 2014; Scimeca *et al.* 2013). Young (1998) has been credited with devising the term Internet addiction disorder (IAD) which was used to describe excessive and problematic Internet use displaying features such as preoccupation and an inability to cut back on their usage of the Internet (Murali and George, 2007). Internet addiction refers to using the Internet for more than 38 hours per week and even though the real extent of Internet addiction is not known, the estimated figure is reported to be between 5 and 10% of all online users (Murali and George, 2007). Researchers have endeavoured to classify Internet addiction (IA) into several different categories and as Murali and George (2007) explain, this feat was achieved by Young (1999) who categorised (IA) into the following five categories: cybersexual addiction, cyberrelationship addiction, computer addiction (which includes activities such as game-playing), information overload (including uncontrollable database searching) and finally Net compulsion (which includes tasks such as gambling or shopping on the Net).

However, Griffiths (2000) argues that many of these are not Internet addicts but merely using the Internet as a medium to fuel a different addiction completely and highlights how there is a need to distinguish and differentiate between addiction to the Internet as opposed to addictions on the Internet.

Young (1996) highlights those Internet applications most utilised by both dependent and non-dependent users. The results show that applications accessed by non-dependent and dependent users differs from that of non-dependent users using aspects of the Internet such as Information protocols and the World Wide Web (W.W.W.) to enable them to gather information compared to dependent users who mainly used the two-way communication functions of the Internet such as chat rooms, e-mail, news groups and MUDs which differs from chat rooms was originally Multi-User Dungeon with later variants such as Multi-User Domain a spin-off of the old Dungeon and Dragons game which seen players take on character roles (Young, 1996) .

Table 1 displays values recorded from Young's research in 1996 for different Internet applications used by both dependent and non-dependent computer users, although with the huge changes in aspects of Internet use these figures will have changed greatly also with the introduction of newer computers, smartphones and hand-held devices etc.

Table 1. Internet applications most utilized by dependents and non-dependents

Application	Type of Computer User	
	Dependents	Non-Dependents
Chat Rooms	35%	7%
B vMUDs	28%	5%
News Groups	15%	10%
E-mail	13%	30%
WWW	7%	25%
Information Protocols	2%	24%

(Young, 1996)

Due to the relative newness of the disorder referred to as Internet addiction, there is still however very little information which clearly highlights the habit-forming nature of the Internet and the consequences that are associated with it (Young, 2004). Despite this claim by Young (2004) the past decade as highlighted by Romano *et al.* (2013) has witnessed much debate in medical literature with the term being regarded by many as a novel psychopathology which may indeed effect many individuals. There are many varied uses of the Internet by Internet addicts but using it for gambling and pornography are common among this group of individuals resulting in a negative impact across areas of the individual's personal life and family functioning (Romano et al, 2013). There has been minimal research to explore the immediate psychological impact of exposure to the Internet on 'Internet addicts' which can act as a driver in cases of such problematic behaviour (Romano *et al.*, 2013).

Due to a lack of research, testing and validity of the term 'Internet addiction' many critics have suggested that maladaptive, excessive or problematic Internet use (PIU)

should replace the term 'Internet addiction' (Murali and George, 2007). Once the principle that people can become addicted to the Internet is accepted a further problem exists as the Internet consists of many different activities such as e-mailing, browsing information, file transferring, etc. and some Internet activities are more addictive than others (Griffiths, 1997).

Defining Addiction and Internet Addiction

In the same manner as an alcoholic who needs to consume large amounts of alcohol to achieve satisfaction, an Internet addict routinely spends a significant amount of time online and may go to great lengths to disguise their online activity and the extent of their Internet behaviour (Young, 2004).

The Internet which was originally designed for the facilitation of research among both academic and military agencies however, prolonged use by some people has created an awareness among the mental health community which has caused much debate about Internet addiction (Young, 2004). The term Internet addiction has been described by Fu *et al.* (2010) as a growing psychiatric disorder although much debate exists as to this description. Regarding Internet addiction and its definition there are many health care professionals and researchers who are uncertain as to the validity in terming it a legitimate mental health disorder (Fu et al, 2010).

A well-defined definition is required for both Internet addiction in children and adolescents (Christakis, 2010). The addictive use of the Internet is a new experience which is developing in a rapid manner (Young, 1999a). The term addiction must firstly be defined before it can be decided as to whether Internet addiction is in fact a problem and truly does exist in some of today's Internet users.

Young (2004) defines an addiction as the following:

Addiction of any kind is traditionally associated with an uncontrollable urge, often accompanied by a loss of control, a preoccupation with use, and continued use despite problems the behavior causes.

The Internet is capable of and does create obvious changes in mood with almost 30% of Internet users having admitted to Internet use in a bid to reduce negative feelings or mood, hence they are using the Internet like a drug (Greenfield, 1999).

Many believe that addiction is a term which should only be applied to the ingestion of a drug (Young, 1999a; Griffiths and Pontes, 2014). Although some individuals' views have moved on to include several different behaviours which do not involve the use of an intoxicant and include compulsive behaviour such as gambling, playing video games, overeating, exercise, love relationships as linking the term addiction solely to drugs does not prohibit its use for similar conditions which do not involve drugs. Despite the restrictive definition of addiction there is however no grounds for linking the word addiction solely to drug habits and there is no basis to assume that the most severe addictions automatically involve the use of drugs and therefore the term should not be limited solely to drug use (Alexander and Schweighofer, 1988; Griffiths and Pontes, 2014).

The American Society of Addiction Medicine (ASAM) defines addiction as a chronic brain disorder which officially proposes that for the first time ever that addiction is not limited to substance abuse only. Addictions, whether they are chemical or behavioural do share certain characteristics which include salience, compulsive use (loss of control) modifications in the individual's mood, alleviation of distress, tolerance, withdrawal and the continuation despite the negative consequences (Cash *et al.*, 2012).

Abuse is different in that it is a milder form of an addiction which can worry and create problems for the user but the user is better equipped and has better control over their behaviour allowing them to set limits and regulate their use (Young, 2004). Addiction and abuse of the Internet will both result in consequences such as the student who is obsessively using social media sites to chat with friends loses valuable study time resulting in poor academic performance and the employee who spends too much time surfing the Internet during his/her working hours will result in poor job productivity and may lead to further actions such as job loss.

The major elements which make up an addiction include the fixation on a specific substance or activity which the individual partakes in despite continual, failed attempts to decrease it and the development of mood disturbances as a direct result of these failed attempts (Christakis, 2010). Christakis (2010) also highlights that signs of an addiction are both a greater usage than expected or wanted which can lead to possible loss of employment, jeopardizing both relationships and education or lying about actual usage. While instances such as these are present and can be seen within Internet usage there is a strong foundation that there is an issue with pathological Internet usage and the argument is no longer about the existence of Internet addiction as a condition but rather how widespread it is (Christakis, 2010).

What Are Internet Addicts Addicted To?

There remains no clear and concise reason as to what Internet addicts become addicted to however many suggestions have been proposed including: the physical process of typing, the communication properties the Internet offers, information attained from a wide range of different Internet sites and the allure of applications such as e-mail, gambling, pornographic material, video games are just a few of the many possibilities to attract addicts to the Internet along with the anonymity that it also offers (Murali and George, 2007). Past studies have revealed an association with Internet addiction and psychological variables including shyness, loneliness, self-consciousness, anxiety, depression and interpersonal relations (Ahmadi *et al.* 2014; Weinstein *et al.* 2014; Zhu *et al.* 2015).

Individuals who experience social anxiety may compensate for these feelings of loneliness which they experience by socializing in a game or via social networking sites as they feel safer in online environments due to the sense of anonymity. Such cases where using the Internet relieves an unfulfilled, real-life problem may lead to problematic outcomes and debate as to whether this can be called Internet addiction are ongoing (Kardefelt-Winther, 2014).

The Internet is used by many shy individuals to avoid face to face interaction. They often choose to engage with others in Internet relay chat and virtual multiuser domains (Murali and George, 2007). The addictive potential offered by these massive multiplayer online roles playing games (MMORPGs) has led some people to refer to them as heroin

ware (Murali and George, 2007). Christakis (2010) highlights how reality games which allow people to assume different identities or join forces with team members from all over the globe may pose the greatest risk of addiction. In these worlds, a continuous online presence is vital and going offline may often incur penalties. Such games have a large profit margin and the makers of such games have an incentive to create games which are addictive in nature.

Whether it may be playing games online or the use of the Internet as a medium for communication, there is a differentiation in those which are addicted to the Internet itself as against those using the Internet as a means of fuelling a different addiction (Griffiths, 1998).

Difficulties in Diagnosing Internet Addiction

Universally the Internet is looked upon as a technical instrument which is very much encouraged thus rendering both the detection and diagnosis of addiction as difficult tasks (Young, 2004). The understanding of the criteria which differentiate a normal Internet user from a pathological Internet user (PIU) is essential before a correct diagnosis of this addiction can be achieved (Young, 2004; Young and Rodgers, 1998).

However, the concept and the definition of Internet addiction are still under debate from an academic and clinical point of view (Fu *et al.*, 2010). There is both a sheer lack of evidence-based standardisation and clinical clear-cut clinical assessment criteria for Internet addiction and there is no aetiological explanation for the condition known as Internet addiction and it would be premature to determine the validity of Internet addiction as a condition (Fu *et al.*, 2010).

The achievement of a successful diagnosis of individuals with Internet addiction is complex and further complicated due to the absence of an accepted set of standards for this condition in the Diagnostic and Statistical Manual of Mental Disorders- Fourth Edition (DSM-IV) (Young, 1999a; Cash *et al.* 2012; Young, 1996; Young, 2004; Murali and George, 2007; Young and Rodgers, 1998). Despite the lack of the inclusion of Internet addiction in the DSM-IV many other different conditions are however listed and within this list Pathological Gambling was regarded as the condition whose pathological nature closely resembles that of Internet use (Young, 1996; Young, 1999a; Christakis, 2010; Cash *et al.* 2012; Griffiths, 1998; Young, 2004; Young and Rodgers, 1998; Tao *et al.* 2010; Ko *et al.* 2005; Greenfield, 1999). Employing the use of the condition known as Pathological Gambling as a template for Internet addiction it has been consequently possible to define Internet addiction as an impulse- control disorder which does not feature an intoxicant (Young, 1996; Young, 1999a; Young, 2004; Young and Rodgers, 1998).

Numerous different approaches have been employed in both the assessment and evaluation of the disorder commonly known as Internet addiction and they include: Young's Internet Addiction Test, the Problematic Internet Use Questionnaire (PIUQ) and the Compulsive Internet Use Scale (CIUS) (Cash *et al.* 2012). Through modifications to the criteria for pathological gambling Young (1996a) managed to create a short 8 item questionnaire which could be used as a screening instrument for addictive Internet use referred to as a Diagnostic Questionnaire (DQ) (Young, 1999a; Young, 1996; Young, 2004; Liu and Luo, 2015; Zhu *et al.* 2015; Lai *et al.* 2013). The 8 item questionnaire involved questioning the individual to determine if they felt preoccupied with the

Internet; used it to feel satisfied; thought about their previous session online; anticipated their next session on-line; made unsuccessful attempts to cease or reduce Internet usage; use the Internet longer than planned; felt changes in their mood if they attempted to reduce or stop Internet usage; affected employment, education or relationship; lied as to extent of Internet usage and finally do they use the Internet as an escape from problems such as mood or feelings of depression, anxiety, guilt or helplessness (Young, 1996; Young, 1999a; Tao *et al.* 2010; Murali and George, 2007).

Individuals who took part in the 8-question questionnaire and replied 'yes' to five or more of the questions were termed as addicted Internet users or dependents while the remainder were non-dependents (Widyanto and Griffiths, 2007; Young, 1996; Young, 1999).

The score of five was the same measure used in pathological gambling and was viewed as a sufficient number to make the difference between either normal or compulsive addictive use of the Internet (Young, 1996; Young, 1996a, Young and Rodgers, 1998).

Young (2004) however, recommended that only nonessential computer or Internet use such as that which is neither business nor academic related should be assessed and an individual should only be classified as dependent or an addicted Internet user when they reply 'yes' to five or more of the eight questions over a time frame of 6 months.

In a bid to achieve a definition for addiction which would encompass Internet addiction Griffiths (1998) suggested that six conditions need to be fulfilled and they include salience, alteration in mood, symptoms upon withdrawal, tolerance, conflict and finally relapse. Although this method appears in theory to be both sensible and simple to use it has however lacks sufficient testing and has not been proven (Murali and George, 2007).

Internet addiction is difficult to diagnose as arguments exist regarding many of the diagnostic measures which are available as there is limited agreement on the crucial component, dimensions of Internet addiction and most instruments are self-report and are reliant on the person answering the questions on questionnaires to be honest and as people who suffer from Internet addiction are prone to lying about Internet usage a 'lie scale' which none operate is required to correct this aspect. Also, none of the methods proposed for the diagnosis of Internet addiction specify which actual Internet application (e.g. e-mail, chat rooms, pornography etc.) the Internet user is addicted to (Murali and George, 2007).

There is much controversy surrounding Internet addiction and it also remains unclear to the present time as to whether the underlying mechanisms which are responsible for the addictive behaviour are the same in the various types of Internet Addiction Disorders (IAD) (e.g. online sexual addiction, online gaming and excessive surfing) (Cash *et al.* 2012).

Successful diagnosis of Internet addiction is further complicated as Internet addiction does not seem to exist independently but rather it is comorbid with other psychopathological conditions (Fu *et al.* 2010). Internet addiction has been found to be associated with attention-deficit hyperactivity disorder (ADHD), depression symptoms, low self-esteem, impulsivity, social anxiety, shyness, suicidality and stress, (Akin and Iskender, 2011; Fu *et al.* 2010; Romano *et al.* 2013). Such findings suggest that a new label of Internet addiction may lead to an underdiagnosis of primary psychiatric disorders

(Fu *et al.* 2010). Many health care professionals view excessive Internet use as a symptom of another disorder such as depression or anxiety and think that Internet addiction could be viewed as an impulse control disorder and used to alleviate the anxiety, stress or depression from which they suffer (Cash *et al.* 2012).

Medical Conditions and Internet Addiction

The current research which exists about Internet addiction not only validates the presence of a condition/ disorder commonly known as 'Internet addiction', how it can be related with other social conditions such as substance abuse but it also highlights certain areas of the population which prove to be of an increased risk of being diagnosed with Internet addiction (Christakis, 2010). Such individuals include those with other psychological illnesses, including attention-deficit/hyperactivity disorder (ADHD), depression and social isolation (Christakis, 2010; Thorens *et al.* 2013) and these views are backed up by (Fu *et al.*, 2010) who believe that Internet addiction should not be looked upon as a standalone psychiatric disorder but rather it does not seem to exist independently in individuals and it is more often in existence simultaneously with other psychopathological conditions.

Other conditions which Internet addiction has been known to be present with include depressive symptoms, depressive disorder, social anxiety, shyness, impulsivity, low self-esteem, anxiety disorder and even suicidality (Fu *et al.* 2010; Wu *et al.* 2015). These findings highlight how labelling an individual with Internet addiction may lead to the under diagnosis of primary psychiatric disorders for which there is both proven and effective interventions available (Fu *et al.* 2010). Since many researchers and clinicians have noticed a large variety of mental disorders co- occurring with Internet addiction disorder (IAD) it raises the debate as to whether the IAD or the co- occurring disorder came first (Cash *et al.* 2012).

However, there is a relationship between Internet addiction and depression, anxiety and stress as the more addictive to the Internet an individual is the more stress or anxiety he or she would experience (Akin and Iskender, 2011).

Biological Predisposition to Internet Addiction

Addictions are responsible for activating a combination of areas within the brain known as the 'reward centre' or the 'pleasure pathway' of the brain and when they are activated the release of dopamine is increased along with opiates and a group of other neurochemicals. Over a period, the associated receptors may become affected producing a tolerance or a need for increasing the stimulation of the reward centre to produce a 'high' leading to subsequent behavioural patterns which are required to prevent withdrawal. The use of Internet may also be responsible for the release of dopamine into the nucleus accumbens which is one of the reward structures of the brain which is specifically involved in other addictions (Cash *et al.* 2012).

There are underlying neurochemical changes, most likely dopamine plays a major role in Internet addiction disorder (IAD) as a neuro transmitter in the brain and occurs during any pleasurable act and have proven themselves to be habit forming on a brain behavioural level (Greenfield, 1999; Liu and Luo, 2015). Each time there is a highly pleasurable human behaviour which can be acquired without human interface (as can be

achieved on the Net) there seems to be a greater risk of abuse. The ease at which purchasing of stock, gambling and online shopping via the Internet allows for both a limitless and disinhibited experience. As there is no human interaction in these areas there is a heightened risk of abusive and/or compulsive behaviour in these areas (Greenfield, 1999).

Cash *et al* (2012) highlights the rewarding nature of technology by quoting the following statement made by a 21-year-old male undergoing treatment for Internet addiction disorder (IAD):

I feel technology has brought so much joy into my life. No other activity relaxes me or stimulates me like technology. However, when depression hits, I tend to use technology as a way of retreating and isolating.

Pathological Use of the Internet

The key components of addiction include factors such as the preoccupation with a substance or behaviour with the failure of repeated attempts to reduce it, mood disturbances because of failed attempts to reduce it, a greater usage than anticipated or desired, jeopardizing employment, education or lying about actual usage (Christakis, 2010). With most of these criteria evident in Internet usage and given the strong basis to believe that there could possibly be a strong problem with Internet usage the debate is not about whether it exists but rather just how prevalent it is (Christakis, 2010). There has been considerable debate regarding both the terms and definitions of pathological Internet behaviour and many terms used include Internet abuse, Internet addiction and compulsive Internet use (Greenfield, 1999).

Despite the definition of pathological Internet use (PIU) as an impulse- control disorder which does not employ the use of an intoxicant (Young, 1996) professionals in the field of pathology provide a more restrictive definition for the classification of Internet usage, highlighting that according to the pathologi- cal concept an individual who reportedly uses the Internet for 2 to 3 hours per week is considered as a normal user whereas any individual registering 8.5 hours or above per week is classified as a pathological user (Chebbi et al. 2001). Even though 8.5 hours a week online does not seem like an excessive figure Griffiths (1998) explains that authors argued that it was indicative of problems surfacing in relatively short periods of being online.

Research has shown that specific applications seemed to play a substantial role in the development of pathological Internet use (PIU) and dependents were less likely to control their usage of highly interactive features compared to other online applications (Young and Rodgers, 1998). On-line users presenting with a more extreme danger of pathological Internet use include those individuals which tend to lead more unsociable or lonely lifestyles (Young and Rodgers, 1998). Pathological users of the Internet used it to meet new people for emotional reasons and to play interactive games and these types of people are more inclined to be more socially disinhibited (Griffiths, 1998). However, as the Internet becomes ever-present in society today it is obvious that some of the assumed “symptoms” of Internet addiction (IA) can be construed as the normal movement in how the younger generations entertain or communicate and as an indication of Internet use in everyday life rather than pathological behaviour (Kardefelt-Winther, 2014).

There is a possibility that a unique reinforcement exists which displays that such anonymous on-line relationships gathered using the Internet's interactive applications have the powerful ability to provide the fulfilment of unmet real-life social needs which would otherwise not be met and would remain unfulfilled (Young and Rodgers, 1998).

The prevalence of pathological Internet usage (PIU) is high with Young and Rodgers (1998) highlighting that research on PIU among self-proclaimed 'addicted' users displayed many similar traits such as: they were always anticipating their next session on-line; they felt nervous when they were off-line; they lied regarding their activity on-line; lost track of time when on-line; they believed that the Internet caused difficulties with their careers, finances and in a social capacity

Surveys to test for the effects of pathological Internet use were carried out in both the University of Texas and Bryant College in the USA and the results from both campuses documented that pathological Internet use is both problematic for both academic performance and relationship functioning (Young and Rodgers, 1998).

Family Issues of Internet Addiction

Family plays an important role in an individuals' ability to deal with stress as the family provides the main spiritual and material support system for college students especially in Eastern cultures such as China's (Yan *et al.* 2014). Possibly one of the most damaging effects of Internet addiction is that as unwarranted time is spent on-line the consequences are that neglect frequently occurs within the family circle. Time spent on-line takes the place of social activities, family social life and interests and ultimately disrupting family relationships (Murali and George, 2007; Griffiths, 1998; Akin and Iskender, 2011; Young, 1999a). The occurrence of Internet addiction in adolescents in Asia was reported to be 13.8% in Taiwan, South Korea reported to be 10.7%, Hong Kong a reported 6.7% with China reporting 2.4% (Lai *et al.* 2013)

Online affairs are highlighted as one of the most common consequences associated with the Internet and Internet addiction (Young, 2004). The problem experienced because of online affairs is that the addicted member of the relationship will isolate himself or herself and refuse to engage in activities such as going out for dinner or attending sports events which they previously enjoyed together as a couple (Young, 1999a). Cyber sexual infidelity is reported to be a common reason for couples looking for advice or marriage counselling and it is the most upsetting aspect of Internet-based sexual infidelity as it violates both the marital and family space (Greenfield, 1999). Individuals develop online relationships which over time overshadow the time spent with real people to the point where matrimonial lawyers have witnessed a significant increase in divorce cases solely from information of such cyberaffairs (Young, 1999a). Such cyberaffairs are defined as romantic or sexual relationships which originate through contact online and continue mainly by electronic discussions via e-mails, chat rooms or interactive games (Young, 2004).

Using these virtual groups strangers from all over the world can meet up instantly 24 hours a day and 7 days a week and it is a breeding ground for the development of online affairs causing problems in marriages that were once solid and cyberaffairs have caused the destruction of many marriages. Serious relationship problems in 53% of Internet addicts surveyed resulted in marital discord, separation and in some cases even led to divorce proceedings. explains how online affairs differ dynamically from real- life

affairs with the potential to be more seductive and due to the global nature of the Internet online affairs can be more glamorous than the partner they already have in their day to day life enabling users to interact with other individuals without the fear of rejection (Watson, 2015; Young, 2004).

Electronic communication can accelerate the intimacy and people are more open and honest online allowing intimacy which may take months or years to create offline to be created in a matter of weeks or days in an online relationship. Seemingly harmless online relationships can easily progress to secret phone calls, letters and meeting offline and can see what was once an online affair ultimately turn what was a happy marriage or relationship into a possible divorce (Young, 2004). Unlike affairs which happen outside the home the online affair has the possibility to start in the marital home while the unsuspecting spouse has been sitting in the next room (Young, 2004). The question is there a limit to how much time spent at a computer is too much and how can a wife or husband know if their partner is having an online affair while at the computer.

The following indications are possible signals of an online affair:

- **Altered Sleeping Patterns:** The change in an individual's sleeping habits is one of the first warning signs of an online affair as chat rooms and other such meeting places which are used for cybersex do not heat up until late at night so the unfaithful person in the relationship may start staying up later to be part of the action (Young, 2004). The unfaithful partner starts to go to bed in the early hours of the morning or the unfaithful person in the relationship suspected of having an online affair may start getting up 1 or 2 hours earlier each morning to use the computer and have an e-mail exchange with their new online romantic partner before they go to work. Thomas (2014) describes how the Internet makes cybersex a particularly exciting type of sex addiction due to its accessibility, affordability and the anonymity that it offers and is often referred to as the Triple- A Engine as a result.

- **Demanding Privacy:** When a person starts, an affair be it online or offline the usually go to extreme lengths to hide this from their partner and the same is true for cyberaffairs as they lead to the greater need for privacy and secrecy for their use of their computer. The person having a cyberaffair will generally move the computer from the view of others in the household, especially their partner and may even change the password of the computer or laptop they are using or hide their online activities in a bid to keep their affair from their partner. The person having the affair will react with anger or be defensive in a bid to hide his or her online activity (Young 2004).

- **Ignoring Their Daily Responsibilities:** As the Internet user increases their time spent online this results in responsibilities within their day to day lives suffering. This is not automatically a sign of a cyberaffair. The person spending more time at the office than usual or neglecting housework that is normally done or tasks such as mowing the lawn may indicate that somebody else is competing for the suspected person's attention and time as the novelty and excitement that are created by an online affair and the husband or wife does not feel the same sense of responsibility to household tasks as they felt before the computer came into his or her life.

- **Evidence of Lying:** The partner having the affair on the Internet tends to lie about the length of time length of time their Internet sessions last (Young, 2004; Fu et al. 2010; Young 1999a; Young 1996). The person involved in the cyberaffair will lie about Internet charges and hide bills such as credit card bills to conceal their Internet usage (Young, 2004; Young, 1999a; Young 1996). Such behaviours create distrust between the couple in

a relationship and over time this will damage the quality of what was once a happy relationship (Young, 2004) Those involved in online affairs find themselves telling bigger lies in a bid to conceal the existence of their online relationship (Young, 2004). Such behaviours create distrust in what was once a stable relationship (Young, 1996) which finds both partners arguing about computer usage and trust in the relationship is broken (Young, 2004).

- **Change in Personality:** The mood in the person engaging in the Internet affair changes and they may become withdrawn and cold in what was once a warm and happy relationship. If a person is questioned about their Internet usage they often respond in denial and sometimes consciously or not they shift the blame to the person not engaging in the cyberaffair (Young, 2004).

- **Lose Interest in Sex:** In some cases, online affairs can lead to either phone sex or meetings in real-life. The process of sharing secrets of sexual fantasies online can change an individual's pattern of sexual interest with their real-life partner (Young, 2004). Those who engage in online affairs are less enthusiastic to their real-life partner.

- **Reduced Investment in the Relationship:** Individuals who pursue online affairs have less energy to put into their real-life relationship with their partner. The excitement of going on vacation together is not what it once was and they avoid making any long-range plans with their real-life partner.

The discovery that you have an unfaithful partner is difficult especially as it is with someone that your unfaithful partner has not actually met in real-life. In many cases the faithful partner will try to take charge of the situation by not disclosing it to close friends and family. Through sheer frustration and jealousy many faithful partners try to control the situation by controlling the partner's time spent online, taking measures such as changing passwords on online devices within the house and in severe cases cancelling the Internet provider to the home or dismantling the computer itself to rebuild the relationship they once had with their partner (Young, 2004) with the ignored or unloved partners of Internet addicts often referred to as a 'cyberwidow' (Murali and George, 2007).

Student Internet Abuse

The Internet is an essential tool providing a wealth of information and enabling lectures to be viewed online to view at our leisure. It enables research to be carried out on many different devices by students and teaching staff alike and has been advertised as an important educational tool which has led to the integration by many schools of Internet services within the classroom environment. Even though the Internet is an ideal tool for carrying out research both psychologists and educators alike have been aware of the negative impacts which accompany this tool, especially the over use or misuse of the Internet (Murali & George, 2007; Young, 1996). One survey carried out revealed that a total of 86% of teachers, librarians and computer coordinators that responded believed that the usage of the Internet by children does not improve the child's performance arguing that information on the Internet is too disorganised and it is unrelated to the school curriculum to assist students and the Internet can serve as a distraction (Barber, 1997).

In a study by Young (1998), 58% of students suffered from a result of poor study habits and poor grades or even failed school because of excessive Internet use. Many

students are unable to control their Internet usage and as a result there has been a reported decline in their study habits due to extreme Internet use resulting in a substantial decline in student grades, class attendance and in severe cases students being placed on probation due to their excessive Internet use (Young, 1996a).

Colleges are now beginning to recognise the possible influence of Internet use as counsellors at the University of Texas-Austin began to realise that the leading issue for many students was their inability to regulate their Internet use, a view that was confirmed when a study of student Internet abuse at the campus revealed that 14% displayed the conditions of Internet addiction (Young, 2004).

Despite the merits of the Internet which is an ideal research tool for students if used correctly many students experienced significant academic problems as they found themselves surfing inappropriate web sites, taking part in chat room gossip, communicating with pen-pals and playing interactive games online all of which affected the result of their own studies. Due to these activities, many students encountered difficulty completing homework assignments, studying for upcoming exams, getting sufficient sleep to be alert for the next day's classes and those not able to control their Internet use found themselves achieving poor grades, receiving academic expulsion and sometimes resulting in expulsion for university entirely (Young, 1996; Young, 2007).

The high dependence of the younger generation on the Internet for learning, leisure and social activities is recognised as a social problem and this generation are also more vulnerable to the influences of the media (Fu et al. 2010).

When compared to other sections of society college students are regarded as being more susceptible to Internet addiction due to psychological and developmental characteristics of adolescence and early adulthood and easy access to and expected use of the Internet. Stress, family support or the lack of it and the harmful use of alcohol use among college students are all factors in the development of Internet addiction (IA) (Yan et al. 2014; Weinstein et al. 2014).

College administrators are however now starting to see the possible impact of which Internet usage can have on their students/younger generation with many realising that they have invested money into what they believed to be a great educational tool only to find out that it can be misused and very easily abused (Young, 2004).

When the head of Alfred University in USA looked further into the reasons why normally successful students had been dismissed to his amazement he found that 43% of these students had failed school due to lengthy night-time logins to the university's computer system (Young 2004; Young 1999a).

The University of Texas Austin was one of the first campuses to carry out a study on student Internet abuse as counsellors at the University began seeing students whose primary problem was an inability to control their Internet use (Young, 1999a; Young, 2004). Findings revealed that from 531 valid responses from students there was a total of 14% which met the criteria which qualified them for Internet addiction (Young, 2004).

Internet addiction (IA) is both a newly evolving social and mental health issue among youths today attracting much attention worldwide, particularly in certain Asian countries such as South Korea and China have already recognised Internet addiction as a public health problem with reports that China which is ranked as the largest Internet broadband market worldwide claiming that one in every six Chinese Internet users may have already developed some degree of Internet addiction (Fu *et al.* 2010; Yan et al.

2014; Block, 2008). The average South Korean high school student spends about 23 hours every week online gaming, a further 1.2 million are believed to be at risk of addiction and require basic counselling (Block, 2008).

A 2009 National report on Internet Addiction of the Chinese youth community carried out by the China Youth Association for Network Development revealed that 14.1% of young people in China aged 13-29 years old (i.e. at least 24 million youths) were possibly addicted to the Internet with more than half of these college or high school students (Yan *et al.* 2014).

Factors Contributing to Student Internet Abuse

With such a widespread existence of Internet abuse the question which needs answering is what are the factors contributing to student Internet abuse. Young (2004) attributes the following factors for abuse of the Internet by students.

- **Unlimited Internet Access:** When students enroll in universities today they receive their student ID card. However, despite receiving their ID card they more importantly they also more importantly receive a free personal e-mail account with no online service fees to pay, no limits as to the amount of time they can remain logged on and the luxury of computer labs which are available for 24 hours a day which equates to any Internet user's dream scenario.

- **Large Volume of Unstructured Time:** With the large amount of unstructured time students have time to explore the campus and activities at the campus they are attending but many choose to forget this and concentrate on one activity: The Internet.

- **Freedom From Parental Control:** Many students are experiencing life away from home for the first time without the watchful eyes of their parents. The use of chat rooms at all hours of the night is not checked by their parents.

- **Lack of Monitoring and Censorship of Online Activities:** While in college or university the monitors of the computer labs are usually senior volunteer students whose responsibility is to help students, who require assistance using the Internet and not telling students what they cannot do while on the Internet.

- **Encouragement From Faculty and Administrators:** Students are under the presumption that the faculty wants them to make full use of the resources supplied. There is usually no option when it comes to not using online facilities as with large classes most course material such as lectures is placed online, many assignments are submitted via e-mail and if a student required to contact a lecturer out of class time to ask a question this is also carried out online. Administrators must be seen to justify the financial outlay they invest in computers and Internet access on campus.

- **Social Intimidation and Alienation:** Many campuses can have up to 30,000 students on campus and it is very easy for some students to feel lost in the crowd. When these students reach out they invariably run into tighter clicks than those they experienced in high school. To hide from the difficult feelings of anxiety, depression, pressure of making top grades, fulfilling parental expectations, graduation and the competition of finding a good job they join the faceless community of the Internet which allows them to find friends worldwide.

Employee Internet Abuse

The benefits of employees having access to the Internet is a benefit for the employee and the company alike enabling the employee to carry out tasks such as market research and business communication (Young, 1999a). However, despite these benefits (Murali and George, 2007) report that employees with access to the Internet at their desk spend a lot of their time during a business working day engaged in Internet use which is completely non-work related.

Employers are inclined to underestimate the amount of time employees spend on their mobile phones and underestimate the amount of time spent on social media. Such flexible anytime, anyplace attitude to working on mobile devices can very quickly become “all the time and everywhere” (Jeske *et al.* 2016).

Since approximately 70% of companies provide Internet access to more than half of their employees and due to the widespread reliance, that we as individuals have on the Internet in the world today there has been a drive to carry out surveys within the industry sector to investigate the prevalence of employee Internet abuse while at work (Young, 2004).

The wrongful use of the Internet in the workplace by employees is of grave concern for managers at work, with a survey of the nation's leading 1,000 companies highlighting that 55% of company executives were of the belief that time spent on the Internet for non-business reasons was detrimental to the efficiency by which their employees could carry out the tasks involved in their job (Young, 1999). The use of new monitoring devices enables employers to track Internet usage and one company which carried this out practice had its worst fears confirmed, revealing that only 23% of the Internet usage within the company was for business purposes (Young, 1999).

The rise in employee Internet usage has resulted in the development of new electronic monitoring companies such as Cyber Surveillance, Websense and Spector Pro which include features such as logging Internet conversations, web activity and the tracking the history of employee Internet usage either weekly or daily (Young, 1999).

Employee abuse of the Internet during working hours has the potential to create Internet addiction among the workforce and have further consequences for the business which include the following:

- **Business Epidemic:** A survey by an online analyst firm of 1439 workers revealed that 37% of workers admitted to surfing the Net continually at work, while 32% admitted to surfing a few times a day and 21% admitting to surfing the Net a few times a week (Young and Case, 2004; Young, 2004)

- **Disciplining & Termination of Employees:** A further survey of 224 companies by the electronic monitoring firm Websense Inc, revealed that a total of 64% of these companies have disciplined employees while a further 30% have had their contracts terminated for improper Internet usage. The main reasons requiring termination or disciplinary action to be taken included (42%) accessing pornography, (13%) chatting online, (12%) involved in gaming, (8%) sports-related, (7%) investing and finally (7%) shopping from work (Young and Case, 2004, Young, 2004). A report on online usage carried out in the year 2000 reports how in the USA 73% of active adult Internet users confess to having accessed the Web at least once from work, while 41% do most of their online activity from work and 15% go online solely from work (Young and Case, 2004).

- **Lost Productivity:** Internet usage by employees at work equates to billions in lost revenue for employers with Vault.com estimating that the figure for employee Internet abuse costs the U.S. \$54 billion in lost productivity each year (Young and Case, 2004).

- **Negative Publicity:** A survey covering a diverse range of industries and employees within these different industries found that a total of 83% of companies were concerned over the inappropriate Internet usage by employees and the resultant negative publicity from employee termination because of abuse of the Internet makes potential customers less trustful of the integrity of such companies (Young and Case, 2004).

- **Legal Liability:** Even though Internet is invaluable resource in companies today the wrongful termination of employee contracts for using a tool which the company has supplied and the diagnosis of Internet addiction leaves companies open to being sued in a court of law.

Treatment Strategies for Pathological Internet Abuse

In today's world, the use of the Internet is both essential and increasing in use both in business and in households. Given that the Internet has numerous positive uses and advantages in day-to-day life such as electronic correspondences to vendors regarding orders in the world of business and the practice of Internet banking in the home environment (Young, 1999a; Murali and George, 2007). Due to the many positive uses of the Internet in our daily lives, customary examples of the standard treatment which include abstinence as used for individuals presenting with substance addictions is not the focus of treatment for Internet use as treatment for individuals who display excessive Internet use should be moderation and controlled use (Murali and George, 2007; Young, 1999). There is a consensus that total abstinence from the Internet should not be the goal of any interventions in the treatment of Internet addiction but rather the goal should be to achieve an abstinence from problematic applications and both a controlled and balanced Internet usage should be the desired outcome (Cash *et al.* 2012). A significant finding shows that individuals which present with Internet addiction (IA) are associated with poor impulse control so understanding the neural basis which underlies poor impulse control in IA subjects may be of great importance in firstly the diagnosis and secondly the treatment of this disorder (Li *et al.* 2014).

Internet addiction disorder displays a resistance to treatment, involves significant risks, demonstrates high relapse rates while making other disorders less reactive to therapy (Block, 2008). However, evidence based intervention for the intervention in a stand-alone diagnosis of Internet addiction is not currently available as further treatment studies are required to examine Internet addiction as a secondary outcome measure (Fu *et al.*, 2010).

Approaches for treating pathological Internet use are very much in their infancy as there is little research in this area with no recognised or effective treatments available. However, initial indications despite being early point to the effective nature of behavioural strategies in the treatment of Internet addiction (Murali and George, 2007).

Based upon individual practitioners who have worked with individuals with Internet addiction and research findings from other addictions there are several different techniques employed to treat Internet addiction and they include the following eight strategies which as Cash *et al* (2012) explains are already known from the cognitive-behavioural approach.

1. Practising the opposite. Once the patient's usual pattern of logging on to the Internet is realised, interrupt this pattern by proposing they use the Internet at alternative times by proposing a different schedule.
2. Employing external stoppers. Employ the use of actual events or real goings-on in a bid to encourage the patient to log off from their current use.
3. Set goals.
4. Abstain from an application.
5. Use reminder cards.
6. Develop a personal inventory.
7. Enter a support group.
8. Family therapy.

The first three methods for dealing with Internet addiction are however only methods for the management of the Internet addict's time and upon failure of these fail there is a requirement to adopt a more approach. Those patients which discover positive methods of managing in their day-to-day lives should no longer rely on the Internet to control frustrations, however within the early stages of recovery these patients will have a void in their lives with the loss of the lengthy periods which they previously spent online. For most patients that derive a great source of pleasure from the Internet the adjustment to no longer having it as the central part of their lives anymore can be very difficult (Young, 1999a).

- **Practising the Opposite:** A major factor in the treatment of an Internet addict is the restructuring of the way in which the Internet addict manages their time. When treating, the Internet addict the clinician should take time to ask questions to understand the addict's current habits of using the Internet. In a bid to ascertain the extent of the Internet addict's current problem the clinician should find out: which days of the week the Internet addict usually goes online; what time of the day do they normally start their online usage; the length of time they spend in a typical on-line session and finally where they carry out their computer use (Young, 1999a).

Once evaluation of the patient's Internet use has been achieved it is essential to create a new timetable with the client which practices the opposite to what they are currently practicing. The ultimate objective of this is to disrupt the client's current routine in a bid to adjust to new time patterns of use and disrupt their old on-line habit. If an addict checked their e-mails first thing every morning, then change this and have their shower followed by breakfast before logging on and if the addict has an established pattern of coming home and logging on and sitting in front of the computer then they should change this and have dinner and watch the news before logging on. For those patients who never take breaks then he or she should be reminded to take a break from the Internet every half hour. Addicts that use the Internet all weekend should change this pattern to just weekdays. This simple tool helps Internet addicts in the step to changing an online practice use which is opposite to what they are used to (Young, 1999a).

• **Employing External Stoppers:** This technique uses real things such as places the Internet user needs to go to as ways of assisting him or her log off such as leaving for work although this is fraught with danger as there is the possibility that the patient may disregard such natural alarms. If this happens then the placement of an alarm clock which is pre-set to determine when the Internet session should finish nearby so when the alarm rings it is time to log off (Young, 1999a; Cash *et al.* 2012).

• **Setting Goals:** Attempts to limit online usage in many cases fail as users rely on an unclear plan to trim hours without defining firstly when their remaining online slots will come. In a bid to prevent relapse occurring the Internet addict should have a program of sensible goals such as 20 hours in place of the current 40 and those 20 hours should be written on a weekly planner so Internet sessions have time slots which are brief but frequent thus helping to evade longings for the Internet and withdrawal. For example, a 20-hour schedule could be split into the following slots, 8p.m. to 10p.m. every weekday and 1p.m. to 6p.m. on Saturday and Sunday. Using a schedule such as this will give the patient/addict the feeling that they are in control rather than allowing the Internet to take control of them (Young, 1999a; Cash *et al.* 2012).

• **Abstinence:** A clinician's assessment will diagnose an application such as chat rooms, interactive games, World Wide Web (W.W.W.) or news groups as the most problematic for the patient. Upon identification of the application which is most problematic to the user the next course of action is restrained use of this application and if this course of action fails then abstaining from it completely is the next stage in the Internet addict's treatment. While abstaining from the application completely the Internet user is still allowed to use other applications which the user finds less interesting or those which the user has a genuine reason for using. This means that a patient who finds chat rooms addictive should abstain from them but that they can still use the W.W.W. to make holiday reservations or shop for a new car (Young, 1999a). Abstinence is most appropriate for those patients who present with a previous history of a prior addiction such as alcoholism or drug use. Many patients with such a previous history find the Internet a safe substitute to their addiction and many become obsessed with the Internet thus preventing a relapse into drug use or drinking. Although such patients justify the Internet as a safe addiction they still avoid dealing with the unpleasant situation which has triggered this new addictive behaviour. The introduction of previous approaches which have been effective for each individual Internet addict it will allow him or her to manage their Internet usage efficiently enabling them to focus on their underlying issues (Young, 1999a; Cash *et al.* 2012).

• **Reminder Cards:** In a bid to support patients so that their concentration remains focused on the end goal of either reduced abstinence or complete abstinence from an Internet application the Internet addict is encouraged to make a list, firstly of five major problems which Internet addiction causes and secondly five major reasons for reducing Internet use or abstaining completely from a specific Internet application (Young, 1999a; Cash *et al.* 2012).

Problems may include things such as marital problems, problems at work, poor academic grades whereas benefits will include a better home life, more time with family, better grades at school and more productivity in the workplace (Young, 1999a). By putting these points on a card and carrying the card in their wallet, trouser pocket, coat or purse the patient when tempted to use the Internet should look at the card and make a point of taking this card out several times a week to reflect on the problems that Internet overuse causes. Young (1999a) highlights how making decisions about what is included

on the cards should be both as broad and as honest as possible. This tool is useful later as the patient has cut down on Internet usage or quit it completely as it prevents relapse into a state of Internet addiction again and (Young, 1999a).

- **Personal Inventory:** Young (1999a) highlights that whether a patient is trying to reduce their usage of an application or achieve abstinence from it the clinician treating them should tell the patient to take time to make a personal inventory of activities such as fishing, hiking or golf that he or she has had to cut down on due to their increased time spent on the Internet. The clinician should make the patient list all activities and practices which have been neglected or curtailed due to their Internet use and rank them as follows: very important, important and finally not very important as this exercise shows the patient exactly what they are missing out on due to their increased time spent online. Such practices are beneficial to patients that feel euphoric when engaged in online activity as it cultivates pleasant feelings achieved from real-life activities thus reducing their need for emotional fulfilment on-line.

- **Support Groups:** The absence of real life social support in the lives of individuals has been responsible for propelling these individuals towards the addictive Internet use from which they now suffer. Individuals who spend long periods of time alone and adopt lonely lifestyles such as single, retired or disabled individuals turn to online applications such as chat rooms to replace the absence of real life social support in their own lives (Young, 1999a). Akin and Iskender (2011) highlights how loneliness, depression and a reduction in the size of the individual's social circle all give rise to the use of the Internet. Young (1999) highlights how patients who have experienced the loss of loved ones, job loss, divorce may respond by turning to the Internet as a mental distraction from their real- life problems as their on-line world makes their real-life problems fade into the background. Clinicians who carry out a life assessment on their patients and uncover this problem should assist the client in finding a support group that best addresses his or her situation. Clinicians should search out private practices that offer support groups which include those addicted to the Internet as these will be especially useful to those with feelings of inadequacy, low self-esteem. As Young (1999a) highlights addiction recovery groups deal with the Internet user's poor thoughts providing an opportunity to form real life relationships allowing them relief of their social shyness and ultimately their requirement for companionship on the Internet. Such groups enable the Internet addict to find support to help them in challenging changes in their lives like AA sponsors.

- **Family Therapy:** Family therapy may be required for addicts whose marriages and family relationships have been negatively affected because of Internet addiction. Family intervention should focus on the following areas:

- Educating the family on the addictive nature of the Internet.
- Reducing blame on addicts for their behaviour.
- Improve communication within the family including problems which caused the on-line addiction initially.
- Encouragement within the family to assist with the addict's recovery such as finding new hobbies or taking an overdue vacation.

A strong sense of support and encouragement from within the family network can be an important tool in the process of recovering from Internet addiction (Young, 1999a).

According to Chebbi *et al.* (2001) there exists two major kinds of treatment that individuals with Internet addiction can benefit from and they include motivational enhancement therapy (MET) and cognitive behavioural therapy (CBT) with the latter being the more favourable of the two. CBT is a treatment based upon the premise that thoughts determine feelings and patients are taught to monitor their thoughts and identify those thoughts which trigger addictive feelings and actions as they learn new coping mechanisms to prevent a relapse. CBT usually requires three months of treatment or 12 weekly sessions (Young, 2007; Brand *et al.* 2014). CBT has been shown to be an effective treatment for compulsive disorders such as intermittent explosive disorder, pathological gambling and it has also been effective in the treatment of substance abuse, emotional disorders and eating disorders (Young, 2007). CBT is just one treatment approach and further research is required to investigate the long-term effects of this treatment with larger populations along with matching which types of Internet addiction respond best to which treatment types best as this will ultimately lead to long-term recovery. Reality therapy (RT) is a further method used for the treatment of Internet addiction. The goal of Reality Therapy is to encourage the individual to choose to improve their own lives by committing to change their behaviour (Cash *et al.*, 2012). This form of therapy includes sessions which show clients that the addiction they have is a choice and it trains them in management of their time and introduces them to alternative activities to their problematic behaviour (Cash *et al.*, 2012).

The use of psychopharmacotherapy was also used in treatment which involved administering selective serotonin reuptake inhibitors (SSRIs) typically used in treating anxiety disorders including OCD, stimulants for treating ADHD and antipsychotics used for schizophrenia has also reported a decrease of Internet addiction symptomatology and Internet/gaming use times (Kuss, 2016).

Future Research Directions

Asian countries such as China and Korea have already recognised Internet addiction as a public health problem and China which is ranked as the largest broadband market in the World reports that a possible one in every six Internet users may have developed some level of Internet addiction (Fu *et al.*, 2010). Internet addiction is viewed upon as a social problem in the younger generation as they depend upon it for learning, leisure and social activities and are more susceptible to media influences and appear to be less self-regulative.

With no one diagnosis many therapists are unsure that they are looking for Internet addiction and thus it is unlikely to be detected but in Asia where cases are more prevalent therapists are taught to screen for it automatically (Block, 2008).

The year 2006 saw the first opening of the first inpatient treatment centre in Beijing, China with Korea having over an estimated 140 Internet addiction treatment recovery centres. The United States saw the opening of the first inpatient residential care centre in Redmond Washington. A basic understanding of this disorder is required by psychiatrists so early recognition and intervention can take place especially in individuals with other underlying problems (Murali and George, 2007). Due to the ever-increasing use of the Internet in our day-to-day lives, criteria for the successful diagnosis of this disorder are necessary and the recognition of it as disorder by the Diagnostic and Statistical Manual of Mental Disorders is needed so those affected can receive treatment and those diagnosing individuals know the signs of Internet addiction.

Conclusion

People have an increasing reliance on the Internet and it plays an essential part of their everyday lives (Chebbi *et al.*, 2001). Even though this disorder is still in its infancy the problems associated with it are set to rise. With the rapid rise in Internet use, millions more are coming online which has the potential to create a real clinical threat due to the rise in a disorder about which very little is known. Since Internet addiction disorder (IAD) is such a new and innovative condition which causes laughter among many people when mentioned many individuals suffering from this addiction are therefore hesitant about seeking treatment from their clinician as they are afraid that their complaints will not be treated seriously and their current condition will worsen as a result (Young, 1999a). Many find it difficult to comprehend how a tool which is so beneficial in our day-to-day lives as a means of both information and communication could be classified as addictive (Young, 2010).

There is a major requirement to establish an agreement on diagnostic criteria for Internet addiction as this is needed for both the purpose of diagnosis and correct intervention to enable effective and efficient treatment approaches. The American Psychiatric Association (APA) is proposing the inclusion of “pathological Internet use” in the DSM-IV revision concluding that this is the broadest term to use (Young, 2010; Kuss and Lopez-Fernandez, 2016). In 2013, the American Psychiatric Association included Internet Gaming Disorder (IGD) in the appendix of the updated (DSM-V) as a condition which requires additional research prior to its official inclusion in the main manual (Kuss, 2016; Kuss and Lopez-Fernandez, 2016; Zhu et al. 2015). The term Internet addiction is currently being considered for inclusion in the DSM-V as a psychiatric diagnosis which indicates that professionals are beginning to take the matter of Internet addiction seriously (Fu *et al.*, 2010).

References

- Ahmadi, J., Amiri, A., Ghanizadeh, A., Khademalhosseini, M., Khademalhosseini, Z., Gholami, Z., & Sharifian, M. (2014). Prevalence of addiction to the Internet, computer games, DVD, and video and its relationship to anxiety and depression in a sample of Iranian high school students. *Iranian Journal of Psychiatry and Behavioral Sciences*, 8(2), 75. PMID:25053960
- Akin, A., & Iskender, M. (2011). Internet addiction and depression, anxiety and stress. *International Online Journal of Educational Sciences*, 3(1), 138-148.
- Alexander, B. K., & Schweighofer, A. R. (1988). Defining addiction. *Canadian Psychology*, 29(2), 151–162. doi:10.1037/h0084530
- Barber, A. (1997). Net's educational value questioned. *USA Today*, 4.
- Block, J. J. (2008). Issues for DSM-V: Internet addiction. Academic Press.
- Brand, M., Young, K. S., & Laier, C. (2014). Prefrontal control and Internet addiction: A theoretical model and review of neuropsychological and neuroimaging findings. *Frontiers in Human Neuroscience*, 8. PMID:24904393
- Cash, H. D., Rae, C. H., Steel, A., & Winkler, A. (2012). Internet addiction: A brief summary of re- search and practice. *Current Psychiatry Reviews*, 8(4), 292–298. doi:10.2174/157340012803520513 PMID:23125561

- Chebbi, P., Koong, K. S., Liu, L., & Rottman, R. (2001). Some observations on Internet addiction disorder research. *Journal of Information Systems Education*, 1(1), 3–4.
- Christakis, D. A., & Moreno, M. A. (2009). Trapped in the net: Will Internet addiction become a 21st-century epidemic? *Archives of Pediatrics & Adolescent Medicine*, 163(10), 959–960. doi:10.1001/archpediatrics.2009.162 PMID:19805719
- Fu, K. W., Chan, W. S., Wong, P. W., & Yip, P. S. (2010). Internet addiction: Prevalence, discriminant validity and correlates among adolescents in Hong Kong. *The British Journal of Psychiatry*, 196(6), 486–492. doi:10.1192/bjp.bp.109.075002 PMID:20513862
- Greenfield, D. N. (1999). *Virtual addiction: Sometimes new technology can create new problems*. Academic Press.
- Griffiths, M. (1997). Psychology of computer use: XLIII. Some comments on ‘addictive use of the Internet’ by Young. *Psychological Reports*, 80(1), 81–82. doi:10.2466/pr0.1997.80.1.81 PMID:9122355
- Griffiths, M. (1998). Internet addiction: does it really exist? *Psychology and the Internet*, 61-75.
- Griffiths, M. (2000). Internet addiction-time to be taken seriously? *Addiction Research*, 8(5), 413–418. doi:10.3109/16066350009005587
- Hersh, W. (1999). A world of knowledge at your fingertips?: The promise, reality, and future directions of on-line information retrieval. *Academic Medicine*, 74(3), 240–243. doi:10.1097/00001888-199903000-00012 PMID:10099643
- Jeske, D., Briggs, P., & Coventry, L. (2016). Exploring the relationship between impulsivity and decision-making on mobile devices. *Personal and Ubiquitous Computing*, 20(4), 545–557. doi:10.100700779-016-0938-4
- Kardefelt-Winther, D. (2014). A conceptual and methodological critique of Internet addiction research: Towards a model of compensatory Internet use. *Computers in Human Behavior*, 31, 351–354. doi:10.1016/j.chb.2013.10.059
- Ko, C. H., Yen, J. Y., Chen, C. C., Chen, S. H., & Yen, C. F. (2005). Proposed diagnostic criteria of Internet addiction for adolescents. *The Journal of Nervous and Mental Disease*, 193(11), 728–733. doi:10.1097/01.nmd.0000185891.13719.54 PMID:16260926
- Kuss, D. J. (2016). Internet Addiction: The Problem and Treatment. *Addicta-The Turkish Journal on Addictions*, 3(2), 185–192. doi:10.15805/addicta.2016.3.0106
- Kuss, D. J., & Lopez-Fernandez, O. (2016). Internet addiction and problematic Internet use: A systematic review of clinical research. *World Journal of Psychiatry*, 6(1), 143. doi:10.5498/wjp.v6.i1.143 PMID:27014605
- Lai, C. M., Mak, K. K., Watanabe, H., Ang, R. P., Pang, J. S., & Ho, R. C. (2013). Psychometric properties of the Internet addiction test in Chinese adolescents. *Journal of Pediatric Psychology*, 38(7), 794–807. doi:10.1093/jpepsy/jst022 PMID:23671059
- Li, B., Friston, K. J., Liu, J., Liu, Y., Zhang, G., Cao, F., ... Hu, D. (2014). Impaired frontal-basal ganglia connectivity in adolescents with Internet addiction. *Scientific Reports*, 4. PMID:24848380
- Liu, M., & Luo, J. (2015). Relationship between peripheral blood dopamine level and Internet addiction disorder in adolescents: A pilot study. *International Journal of Clinical and Experimental Medicine*, 8(6), 9943. PMID:26309680

- Murali, V., & George, S. (2007). Lost online: An overview of Internet addiction. *Advances in Psychiatric Treatment*, 13(1), 24–30. doi:10.1192/apt.bp.106.002907
- Pontes, H. M., & Griffiths, M. D. (2014). Internet addiction disorder and Internet gaming disorder are not the same. *Journal of Addiction Research & Therapy*, 5(4).
- Poon, S. (2000). Business environment and Internet commerce benefit—a small business perspective. *European Journal of Information Systems*, 9(2), 72–81. doi:10.1057/palgrave.ejis.3000361
- Romano, M., Osborne, L. A., Truzoli, R., & Reed, P. (2013). Differential psychological impact of Internet exposure on Internet addicts. *PLoS One*, 8(2), e55162. doi:10.1371/journal.pone.0055162 PMID:23408958
- Scimeca, G., Bruno, A., Cava, L., Pandolfo, G., Muscatello, M. R. A., & Zoccali, R. (2014). The relationship between alexithymia, anxiety, depression, and Internet addiction severity in a sample of Italian high school students. *The Scientific World Journal*. PMID:25401143
- Thomas, J. C. (2016). A humanistic approach to problematic online sexual behavior. *Journal of Humanistic Psychology*, 56(1), 3–33. doi:10.1177/0022167814542286
- Thorens, G., Achab, S., Billieux, J., Khazaal, Y., Khan, R., Pivin, E., ... Zullino, D. (2014). Characteristics and treatment response of self-identified problematic Internet users in a behavioral addiction outpatient clinic. *Journal of Behavioral Addictions*, 3(1), 78–81. doi:10.1556/JBA.3.2014.008 PMID:25215217
- Watson, J. C. (2015). Internet addiction. *Treatment Strategies for Substance Abuse and Process Addictions*, 293.
- Weinstein, A., & Lejoyeux, M. (2010). Internet addiction or excessive Internet use. *The American Journal of Drug and Alcohol Abuse*, 36(5), 277–283. doi:10.3109/00952990.2010.491880 PMID:20545603
- Wu, C. Y., Lee, M. B., Liao, S. C., & Chang, L. R. (2015). Risk factors of Internet addiction among Internet users: An online questionnaire survey. *PLoS One*, 10(10), e0137506. doi:10.1371/journal.pone.0137506 PMID:26462196
- Yan, W., Li, Y., & Sui, N. (2014). The relationship between recent stressful life events, personality traits, perceived family functioning and Internet addiction among college students. *Stress and Health*, 30(1), 3–11. doi:10.1002/mi.2490 PMID:23616371
- Young, K. (2010). Internet addiction over the decade: A personal look back. *World Psychiatry; Official Journal of the World Psychiatric Association* (WPA), 9(2), 91–91. doi:10.1002/j.2051-5545.2010.tb00279.x PMID:20671891
- Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology & Behavior*, 1(3), 237–244. doi:10.1089/cpb.1998.1.237
- Young, K. S. (1999). Internet addiction: symptoms, evaluation and treatment. *Innovations in Clinical Practice: A Source Book*, 17, 19–31.
- Young, K. S. (2004). Internet addiction: A new clinical phenomenon and its consequences. *The American Behavioral Scientist*, 48(4), 402–415. doi:10.1177/0002764204270278
- Young, K. S. (2007). Cognitive behavior therapy with Internet addicts: Treatment outcomes and implications. *Cyberpsychology & Behavior*, 10(5), 671–679. doi:10.1089/cpb.2007.9971 PMID:17927535

- Young, K. S., & Case, C. J. (2004). Internet abuse in the workplace: New trends in risk management. *Cyberpsychology & Behavior*, 7(1), 105–111. doi:10.1089/109493104322820174 PMID:15006175
- Young, K. S., & Rodgers, R. C. (1998, April). Internet addiction: Personality traits associated with its development. 69th annual meeting of the Eastern Psychological Association, 40-50.
- Zafar, S. N. (2016). Internet Addiction or Problematic Internet Use: Current Issues and Challenges in Conceptualization, Measurement and Treatment. *Journal of Islamic International Medical College*, 11(2), 46–47.
- Zhu, Y., Zhang, H., & Tian, M. (2015). Molecular and functional imaging of Internet addiction. *BioMed Research International*. PMID:25879023

Key Terms and Definitions

Addiction: An addiction is a medical condition which is portrayed by compulsive use in a pleasing stimulus which it may offer despite the long-term negative consequences which it may result in.

Diagnosis: This refers to the identification of a disease or illness through an evaluation of the signs and symptoms individual presents with.

Disorder: A disturbance in body function, structure or both which is inherited or results from development failure from such factors as disease, trauma or poison.

Dysphoric: A feeling of unease, unhappiness or anxiety about oneself as opposed to euphoria which describes a state of extreme happiness.

Internet: A global system of interconnected computer networks which use Internet protocols to link devices worldwide. The Internet carries a vast array of information enabling the passage of information through services and applications of the World Wide Web W.W.W.

Pathological: The behaviour of a person can be described as pathological when he or she behaves in a way that is extreme and unacceptable and displays powerful feelings that they are unable to control.

Predisposition: The state of being likely to behave in a certain way or suffer from a disease or condition.

Psychopathological Conditions: This refers to the development of conditions which manifest themselves because of a mental or behavioural disorder.

Reliance: This refers to the placement of one's dependence or trust in a person or a thing which leads to that individual becoming reliant on that person or thing.

This research was previously published as: Smyth, Shaun Joseph, Kevin Curran, and Nigel Mc Kelvey. "Internet addiction: A modern societal problem." *Psychological, Social, and Cultural Aspects of Internet Addiction*. Bozoglan, Bahadir, (ed.), 20-43. Hershey PA: IGI Global, 2018.

A Survey of Addictive Software Design

by Chauncey Neyman

Abstract

The average smartphone owner checks their phone more than 150 times per day. As of 2015, 62% of smartphone users had used their phone to look up information about a health condition, while 57% had used their phone to do online banking. Mobile platforms have become the dominant medium of human-computer interaction. So how have these devices established themselves as our go to connection to the Internet?

The answer lies in addictive design. Software designers have become well versed in creating software that captivates us at a primal level. In this article, we survey addictive software design strategies, their bases in psychology, and their applications in popular software products. We offer a novel taxonomy to better categorize these addictive design strategies. Additionally, we explore a study conducted at the California Polytechnic State University at San Luis Obispo that illustrates the efficacy of one of the addictive design strategies.

1 Introduction

As Software becomes an integral part of the human experience, Software designers compete for the attention of users. This competition has prompted the emergence of several user retention strategies that apply psychological principles to software design. In this paper, we will refer to these strategies collectively as “addictive software design.”

Before exploring addictive software design, we must define and outline topics that elucidate the importance of the subject. Once we’ve established this importance, we will explore popular addictive design strategies. After covering each of these strategies, we will examine the foundations of those strategies in psychology. Then we will present successful applications of these strategies in popular applications. Finally, we will offer our novel taxonomy to better categorize addictive design strategies.

2 Background

In this section, we will briefly define and outline topics related to addictive software design. These definitions are meant to provide context for the addictive software design strategies in later sections.

2.1 Human-Computer Interaction

Human-computer Interaction (HCI) is a field that arose in the 1980’s as a specialty area in computer science embracing cognitive science and human factors engineering. Today, it is a collection of semi-autonomous fields in human-centered informatics. The field grew in prominence with the rise of personal computers, as the demographic of computer users transitioned from technology professionals to everyday people. [4] Today, Human-computer Interaction remains relevant with the ubiquity of mobile devices. For our purposes, Human-Computer Interaction is the academic topic within Computer Science under which addictive software design falls.

2.2 Psychology

Psychology is the scientific study of how people behave, think and feel. As a science, psychology applies the scientific method to study psychological phenomena. [18] Psychology is the field which provides meaningful scientific explanations to addictive software design strategies.

2.3 Mobile Platforms

Mobile platforms are smart phones and tablets that run software, typically connected to the Internet. They are the dominant medium of Human-Computer Interaction today. As of 2016, 67% of digital time is spent on mobile platforms. [21] This time is increasingly focused in a small subset of apps. Smartphone users spent 45% of their app time on their top app and 73% of their app time on their top three apps. Tablet users spent 87% of their app time on their top three apps. The apps most popular with these users are typically published by Facebook, Google, Snapchat, Amazon, and a few other large publishers. [21] As the dominant medium of Human-Computer Interaction, mobile platforms are the most important platform on which to study addictive software design strategies.

2.4 Internet Addiction

Internet addiction is “a compulsive-impulsive spectrum disorder that involves online and/or offline computer usage and consists of at least three subtypes: excessive gaming, sexual preoccupations, and e-mail/text messaging.” The symptoms of each variation of this disorder include excessive use, withdrawal when the computer is inaccessible, tolerance and negative repercussions (including lying, poor achievement, social isolation and fatigue. Some countries, such as China and South Korea, consider Internet addiction one of their most serious public health concerns. [1] Internet Addiction illustrates the real consequences of implementing addictive design strategies.

3 Addictive Software Design Strategies

In the following section, we will explore many of the most popular strategies of addictive design outlined by researchers, bestselling authors, and prominent designers. We will attempt to ground each design strategy with a corresponding psychological study that highlights its efficacy. This list is not exhaustive.

3.1 Variable Rewards

A reward is “something given or received in return or recompense for service, merit, hardship, etc.” [16] The brain responds positively to rewards. Rewards become variable rewards when they are given randomly and unpredictably. Variable rewards produce more of the neurotransmitter dopamine than regular rewards. [8] Outside of software design, the method of intermittent variable rewards is used most prominently by slot machines. However, mobile applications have begun to take advantage of this effect through the utilization of notifications and other processes. By intensifying the dopamine surges received by their users, software designers are making their products addictive. [2]

3.1.1 Psychological Study: The Skinner Box.

The psychology of rewards has been studied extensively, especially with regards to the neuro-transmitter dopamine. The psychological study most closely tied to intermittent variable rewards involves the “Skinner Box,” in which pigeons and rats were conditioned to pull a lever when prompted by a light. Researchers found that dopamine levels in these pigeons and rats surged when they were expecting a reward. These effects were

multiplied when treats were rewarded at random; adding variability increased the frequency of the pigeons' completing the intended action. [9]

3.2 Social Reciprocity

Social reciprocity is a “mutual exchange” that is social in nature. [16] We are vulnerable to needing to reciprocate others social gestures. [10] This is illustrated by common etiquette like responding to emails or accepting connection requests. Additionally, as inherently social animals, human beings receive chemical satisfaction when they receive social gratification, such as likes. [9] The highly social components of many popular mobile applications contribute to their addictive properties.

3.2.1 Psychological Study: The Power of Reciprocity.

An experiment conducted by Andres Diekmann of the Swiss Federal Institute of Technology explores the power of reciprocity. The experiment involved two groups of test subjects, all anonymous to each other. Subjects from the first group were given 10 tokens worth real money with the option to share some proportion of their tokens with a member of the other group. Later, subjects from the second group were given 10 tokens with the option to share their tokens. Members of the second group reciprocated the gift they'd received almost half the time, and only 10% of the second group did not share their tokens at all. This behavior is not rational, and illustrates the social power reciprocity has on human beings. [5]

3.3 Infinite Scrolling

Infinite scrolling is the idea of loading content on a single page instead of spreading it across a series of pages. [11] It creates an interface through which consuming media is enabled by continuing to scroll, instead of flipping to a new page. This strategy is utilized by many mobile applications. Because there is virtually no end to the materials we can consume via infinite scrolling, we are vulnerable to consuming much more than we would normally without realizing it. This results in users spending much more time on applications than intended.

3.3.1 Psychological Study: The Bottomless Bowl.

Infinite scrolling taps into a psychological phenomena illustrated by the "Bottomless Bowl" study. In 2005, Cornell professor Brian Wansink demonstrated that you can trick people into eating more soup by giving them a bottomless bowl. When their soup refills, people will consume 73% more without even recognizing greater feelings of satiation. [10] These findings are consistent with the notion that the amount of food on a plate or bowl increases intake because it influences consumption norms. [3] This suggests that the time sucking power of infinite feeds is derived from their power to normalize uninhibited scrolling.

3.4 The Illusion of Choice

Just as infinite feeds have the power to normalize uninhibited scrolling, Software Designers have the power to control user choices through the layout of their applications. While an application like Yelp appears to empower the users with reviews of nearby restaurants, it's really controlling the limited number of venues users are exposed to. [10] This illusion of choice can keep users engaged for longer, as dissatisfaction with each choice results in the user spending more time browsing alternatives within the application. However, limiting choices the user is exposed to keeps them acting on those options more diligently. [12]

3.4.1 Psychological Study: Decision Making.

In an experiment undertaken by Stanford's Mark R. Lepper and Columbia's Sheena S. Iyengar, two separate displays of jams were laid out. One display had 24 different types of jams, while the other had only 6 different types. Of the 242 customers who passed by the extensive display, 60% stopped at the booth with the extensive display while only 40% stopped at the booth with the limited display. However, only 3% of people who stopped at the extensive display purchased jam while 30% of people who stopped at the limited display bought jam. [12] This is just one of many studies that illustrates the power of limiting choices: while people may be attracted by a large variety of options, they are more likely to act when given fewer choices.

3.5 User Investment

Human beings irrationally project more value on objects they're involved in building or creating. Many applications take advantage of this phenomena by giving users power to curate their own social media profiles. This is supported by the "Ikea effect," wherein consumers were shown to be willing to pay more money for furniture they'd contributed in creating than for pre-built furniture. [9]

Additionally, investing time, data or social capital into a platform causes users to spend more time on that platform. This illustrates the importance of first-to-market principles, as once users have accumulated followers on one platform, they are less likely to leave that platform even if a marginally better alternative with the same functionality arises. [9]

3.5.1 Psychological Study: The IKEA Effect.

Named after the popular build-it-yourself furniture chain, the "IKEA effect" refers to the increased value consumers place in something they've had a hand in creating. This phenomena is well documented in a Harvard Business School study titled "The IKEA effect: When Labor Leads to Love." When crafting an IKEA storage box, test subjects were willing to spend over 60% more money for the box they'd built than for a similar box built by somebody else. The effect was exacerbated when subjects were bidding on Origami pieces. This psychological principle has been used in many other applications besides furniture, from instant cake mixes (which became much more popular after consumers were instructed to add an egg) to Build-A-Bear stores. [15]

3.6 Gamification

Closely tied to variable rewards, "gamification" is defined in the tech industry as the process of using game mechanics to reward the completion of tasks. [22] Academically, "gamification" has been defined as "a process of enhancing services with (motivational) affordances in order to invoke gameful experiences and further behavioral outcomes." [14] Experts recommend implementing rewards in small, frequent bits so that the user of an app feels a sense of achievement. They also recommend "sharing loops" that integrate rewards with the users social network by allowing the user to share their accomplishments. [22]

3.6.1 Psychological Study: Gamification.

A review of 24 gamification studies found that gamification has a positive impact on the effectiveness of the core service of the platform being gamified. In particular, every study focused on education or learning platforms found a positive effect. In this review, the most commonly implemented gamified elements across the many studies were points, leaderboards, and badges. [14]

4 Applications

This section will cover the applications of these addictive design strategies, particularly with regards to some of the most popular mobile apps available. For reference, the four most downloaded iOS apps of all time are (in order) Facebook, Facebook Messenger, Youtube, and Instagram. [6] Other popular apps we'll look at include Twitter, Uber (the driver version), and LinkedIn.

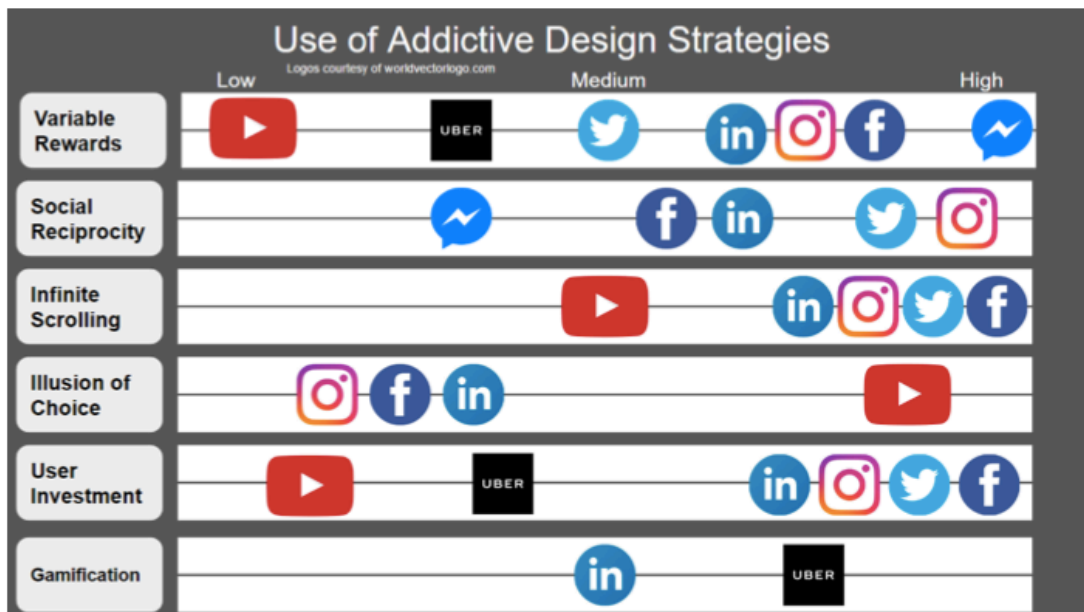


Fig. 1. An illustration of the use of addictive design strategies in popular phone apps

4.1 Variable Rewards

Intermittent variable rewards are used most often in the form of notifications. The Facebook Messenger app relies on notifications and pop ups to alert the user to new messages. The pop ups used by Messenger are some of the most unique of all the major apps, as they appear as bubbles that the user can move around their screen.

The Facebook app utilizes variable rewards in providing notifications for likes, friend requests, and many other activities. Instagram sends notifications for direct messages, when a users' friend posts for the first time in a while, or when somebody likes a users' photo. LinkedIn utilizes notifications similarly to notify users of connection requests, messages and potential job opportunities. Twitter will send users notifications when they are messaged or mentioned. Uber will send drivers notifications when a rider is available to be picked up. And the YouTube app sends notifications when a channel the user subscribes to has posted a new video.

Outside of notifications, Facebook and Instagram are particularly adept platforms at engaging users with "likes." Because a "like" must be given by another user, its delivery is random and satisfying. This is similarly true of "favorites" and "retweets" on Twitter. [9]

4.2 Social Reciprocity

Social reciprocity is either a feature or an emergent property in many social media apps. Apps like Instagram and Twitter have a social etiquette that demands "following back" somebody who has followed you, and the liking and favoriting features can instill a sense of obligation in users to do the same back. Facebook and LinkedIn require friend and connection requests to be accepted before a friendship is made official. And Facebook Messenger messages are shown as "read" to the sending party when opened, motivating users to respond. As these examples illustrate, social reciprocity isn't always an explicit feature. Sometimes it's an unintended consequence of an apps design.

4.3 Infinite Scrolling

Infinite scrolling is most prominently used by Facebook, both on the mobile app as well as the desktop version. It was launched in 2011 at the same time as Facebook Timelines, shortly before Facebook's IPO. [17] The type of infinite scrolling used by Facebook is called "lazy load," because it loads more results as you near the bottom of the page. [13] Before Facebook implemented it, "lazy loading" was used by Twitter and Instagram, and is now used by LinkedIn as well.

YouTube has a different variation on infinite scrolling. While YouTube's search results are paginated (perhaps a result of their ties to Google), they have an autoplay feature which continues to produce related videos to the first one watched manually. Though not explicitly "infinite scrolling," the autoplay feature is a sound example of the same underlying concept of unending content.

4.4 The Illusion of Choice

Most mobile app interfaces use this strategy to direct users between the pages of the apps. What gives these apps the illusion of choice is the way they present a limited set of options as if it were extensive. The YouTube app is particularly adept at this: by presenting the homepage with videos they expect a user to like alongside a search bar, users are given the impression that they can find videos of whatever they want. However, YouTube is meaningfully effecting the content users consume by way of their suggestions and the order of search results.

The illusion of choice is presented effectively in apps like LinkedIn, Facebook and Instagram as well. The results that show up on the main pages of each of these apps appear to be unsorted, chronological posts from all of your friends. However, LinkedIn and Facebook are deliberately tailoring the content that makes it to the top of a users page. And Instagram has recently implemented a similar version of tailored content by showing posts they think you'd like before other posts that are more recent.

Before any of these mobile apps existed, this strategy was being utilized masterfully by Google. While users believe they're searching the full web, Google controls the algorithm that dictates their results. The autocomplete feature of Google (and the similar autocomplete feature used by YouTube) has a powerful effect on the searches users make, yet certain phrases are often blacklisted from those autocomplete lists. For example, typing "crooked hill" on Google will autocomplete with suggestions for restaurants or street names. Typing the same phrase on Bing will autocomplete as "crooked hillary" first - a result that doesn't even appear amongst Google's autocomplete suggestions. [7]

4.5 User Investment

User Investment is often attained through followers, friends and connections. Take Twitter: its core functionality is so easy to recreate that it's been cloned by over 250 other sites. However, Twitter remains dominant in terms of users and valuation. [20] This can be tied to user investment. Twitter users aren't likely to abandon the site for other platforms because they've invested time and energy in gaining followers on their existing account. Even beyond followers, Twitter users have spent time and energy crafting all of the tweets that show up in their history when their profile is examined. [9]

This same notion of user investment is utilized by many other software giants. Instagram uses followers while storing user memories in the form of photos or videos. LinkedIn, as the dominant professional social network, offers access to potential job opportunities through users "connections." Facebook uses friends in addition to their customized Timelines, which store posts as diverse as text, images, and videos. YouTube shows users subscriptions alongside saved videos and videos they've posted. The most successful software apps make it difficult to leave because of the time and energy users invest in them.

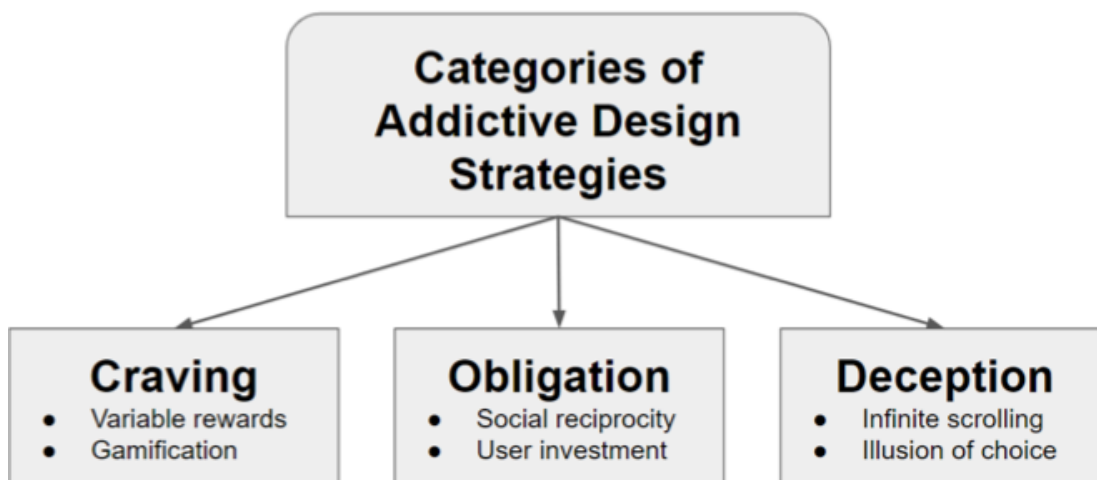


Fig. 2. An illustration of our addictive design taxonomy

Facebook has pioneered another form of user investment through their ubiquity on other platforms. Many sites and apps, such as Tinder, Farmville, and GroupMe, allow users to sign up using their Facebook profiles. By making themselves the middle man between users and other apps, Facebook has made it even more difficult for their users to leave.

4.6 Gamification

Uber has historically had issues with retaining drivers. Recently, to counter this retention issue, the Uber app for drivers has been gamified. To keep drivers on the road for a longer period of time each day, Uber sets arbitrary earnings goals that provide achievements when satisfied. They've also started to queue up the next ride for drivers before they've even finished the one they're currently on. [19]

Gamification is exploited more subtly in other platforms. LinkedIn plots the number of people who have viewed your profile alongside goals and suggestions about how to increase your visibility to employers. Health apps, such as MyFitnessPal, set caloric and exercise goals based on your past information. And Snapchat rewards users for “streaks,” or days in a row that users have exchanged Snaps. All of these examples gamify processes that are seemingly unrelated to games because gamification taps into the human desire for achievement.

5 Categorizations

In this section, we will create novel categorizations for each the addictive design strategies we’ve explored. These categorizations are intended to encompass every addictive design strategy presented in this paper in addition to any addictive design strategies implemented by others in the future. These categorizations are rooted in the psychological weaknesses each strategy takes advantage of.

5.1 Craving

Strategies that fall under the “Craving” category take advantage of the physical, chemical response human beings have to desired types of stimuli. Most often the outcome of these strategies manifest in the form of a dopamine rush. For example, intermittent variable rewards such as message alerts and notifications give users a dopamine rush. [10] Similarly, gamified processes such as achievements can give users a dopamine rush when they are completed. [19] When a user checks their phone expecting a notification, alert, or achievement and they do not receive one, they are illustrating a powerful desire for something, or a “craving.” [16]

5.2 Obligation

Strategies that fall under the “Obligation” category take advantage of the human desire for comfort. Human beings naturally seek stability and reassurance from other humans, and addictive design strategies in this category satiate these needs. [10] For example, social reciprocity strategies maintain and uphold existing social norms by validating friendships or inciting correspondence. Similarly, user investment strategies hook users by getting them so used to a platform that leaving that platform would entail leaving friends, family, and a familiar interface. When a user responds to a message or follows back a friend, they are attempting to fulfill an act to which they feel morally bound, or an “obligation.” [16]

5.3 Deception

Strategies that fall under the “Deception” category take advantage of human gullibility. This typically entails manipulating a user into doing something they wouldn’t normally want to do through the design of an interface. For example, interfaces that utilize infinite scrolling subtly coerce users into spending more time on an app than they intend to. Similarly, giving users an illusion of choice in an app menu while severely constricting their actions to what you want them to do does not always fulfill their desired goals with the app. Each of these strategies gives a mistaken impression to the user, or “deceives” the user. [16]

6 Final Remarks

The well known design strategies outlined in this paper are used by all of the most popular apps on our phones. These software products don't just dominate the market; they dominate our free time. In the future, we anticipate new addictive design strategies to proliferate. Although the specific nature of these strategies may vary, we expect the reason for their effectiveness to remain the same: they take advantage of properties of human psychology. We hope that the categories outlined in this paper increase public understanding of this underlying psychology. Furthermore, we hope this understanding enables fun and responsible software design.

7 Appendix

7.1 Experiment: Facebook Scrolling

In this experiment, students were told to download two Google Chrome extensions (add ons to the Google Chrome web browser). One of these extensions ("timeStats") was designed to measure the time they spent on various websites. The other extension ("Stop Scrolling Facebook") was designed to stop the user every 5 minutes to ask if they wanted to continue scrolling on Facebook. The measure of users desire to spend time on Facebook was the difference between the time they spent on Facebook in one week with the "Stop Scrolling Facebook" extension minus the time they spent on Facebook in one week without the "Stop Scrolling Facebook" extension.

7.1.1 Procedure.

Students were split into two even groups. The first group was instructed to download both the "timeStats" and "Stop Scrolling Facebook" extensions, while the second group was instructed to only download the "timeStats" extension. After one week, researchers reached out to each group and instructed them on how to report their weekly Facebook activity. The results from each group were recorded (measured to the nearest minute). At the same time, researchers instructed the first group to uninstall the "Stop Scrolling Facebook" extension and instructed the second group to install the "Stop Scrolling Facebook" extension. After one more week had passed, researchers reached out again and recorded weekly Facebook activity from each group.

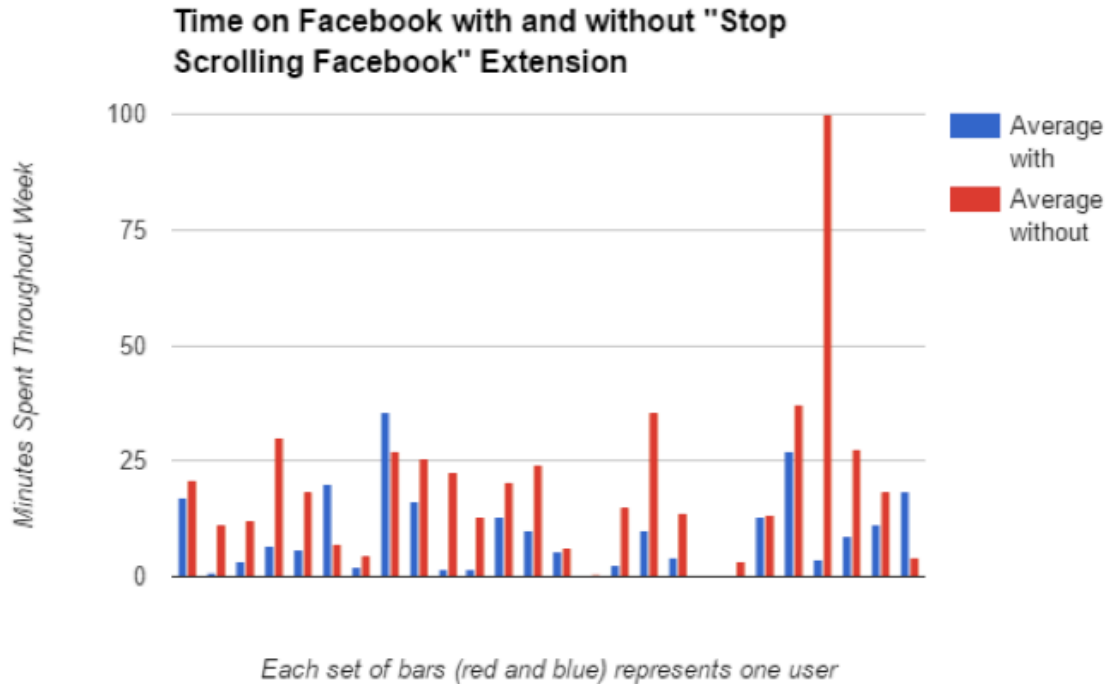


Fig. 3. Results of the Facebook Infinite Scrolling Experiment

7.1.2 Results.

Students spent an average of 10.5 minutes more per week on Facebook without the “Stop Scrolling Facebook” extension than they did with that same extension. The median difference between time spent on Facebook with the extension and without the extension was 9.0 minutes. These differences are significant as students spent an average of only 9.2 minutes on Facebook with the extension vs spending 19.7 minutes on Facebook without the extension—more than twice as long. Further, only 3 students spent more time on Facebook with the “Stop Scrolling Facebook” extension; 21 students spent less time on Facebook with the extension.

7.1.3 Discussion.

This experiment was limited by its restriction to tracking Facebook through a browser. When speaking with the students, most admitted that the majority of their Facebook use was conducted through Facebook’s mobile apps (“Facebook” and “Facebook Messenger”). However, the difference between time spent on Facebook with and without the “Stop Scrolling Facebook” extension installed is still notable. These results illustrate that users spend more time scrolling the news feed on Facebook than they intend to.

7.1.4 Relevance.

This experiment directly tests the efficacy of the “Infinite Scrolling” addictive design strategy outlined in this survey. Its results support the idea that users are deceived into spending more time on a platform with infinite scrolling.

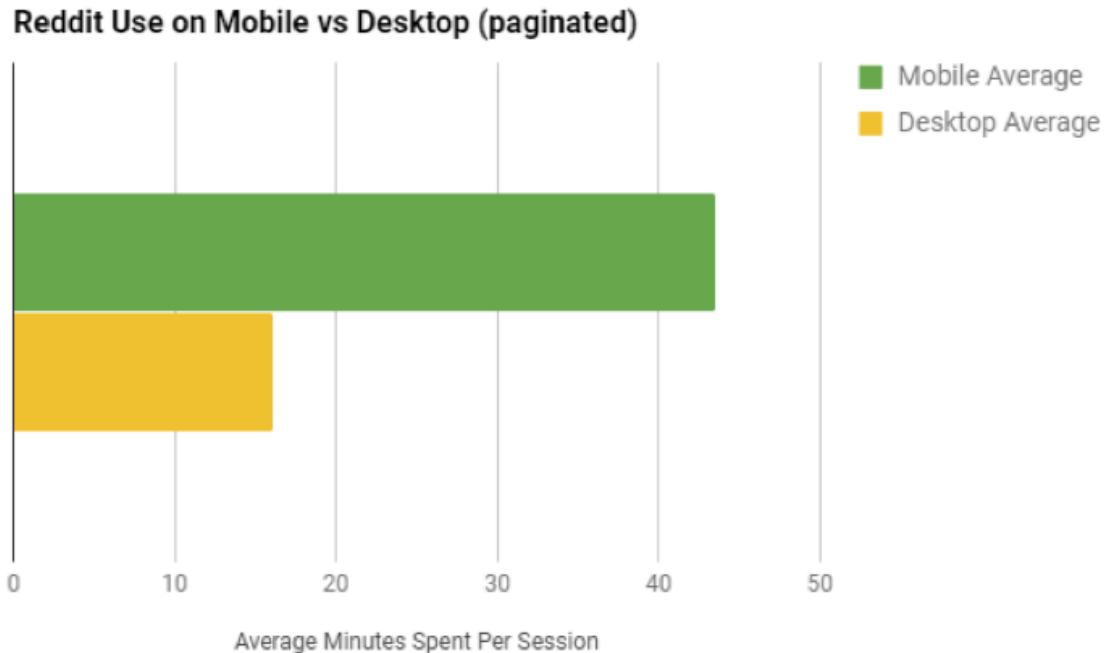


Fig. 4. Results of the Reddit Pagination Experiment

7.2 Experiment: Reddit Pagination

In this experiment, experienced Reddit users were asked to time themselves for two single sessions of Reddit use (where a session is defined as one uninterrupted period of browsing). They were asked to report one session using the Reddit Mobile application (which utilizes bottomless scrolling) and a second session using Reddit via a web browser (which utilizes pagination).

7.2.1 Procedure.

Potential test subjects were polled about their Reddit use. First, subjects were asked if they'd used Reddit before. Next, subjects were asked if they had access to the Reddit Mobile application and a browser. After vetting these potential subjects, each subject was asked to self-time and partake in one session of Reddit using the Reddit Mobile application and another session of Reddit using the browser version of Reddit. Subjects were asked to partake in each session on a different day, to avoid seeing the same posts on different days.

7.2.2 Results.

Every single test subject spent more time on the Reddit Mobile application than on the browser version of Reddit. Users spent an average of 43.6 minutes on the Reddit Mobile application while they spent an average of 16.1 minutes on the browser version. These averages are very similar to the medians, where users spent a median of 37 minutes on the Reddit Mobile application compared to 15 minutes on the browser version. Qualitative feedback consisted of user comments about which application they felt more or less immersed in, with almost every respondent reporting feeling less immersed on the browser version of Reddit.

7.2.3 Discussion.

While this experiment was meant to illustrate the efficacy of bottomless scrolling, these results should be taken with a grain of salt. Because of the nature of the Reddit Mobile application, users almost all used the application on a mobile device while they used the browser version of Reddit on a desktop or laptop device. So while results appear to show that bottomless scrolling is much more effective, they may just suggest that mobile devices are more compelling mediums for media consumption. Further, the vetting of test subjects (by which we required subjects to be Reddit users with access to both versions of Reddit) severely limited our sample size to a group of 7 people, which is not statistically significant.

7.2.4 Relevance.

This experiment is also meant to test the effectiveness of the "Infinite Scrolling" addictive design strategy. As mentioned in the discussion, its results indicate that either infinite scrolling is effective at increasing time spent on an application, users spend more time during sessions on their phone, or some combination of both.

References

- [1] Jerald J. Block. 2008. Issues for DSM-V: Internet Addiction (Editorial). (2008). This editorial summarizes many of the key points of Internet Addiction.
- [2] Bianca Bosker. 2016. The Binge Breaker. (2016). This article by the Atlantic covers Tristan Harris' battle against addictive software.
- [3] Jill North, Brian Wansink, James E. Painter. 2005. Bottomless Bowls: Why Visual Cues of Portion Size May Influence Intake. (2005). This study published in the PubMed journal explores why humans will consume more when they can't accurately gauge portion sizes.
- [4] John M. Carroll. 2017. Human Computer Interaction - Brief Intro. (2017). This site gives a formal definition of human computer interaction and its history.
- [5] Andreas Diekmann. 2004. The Power of Reciprocity. (2004). This study explores social reciprocity in the context of game theory, and covers a bit of reciprocity's academic history.
- [6] Artyom Dogtiev. 2016. Top 10 Most Popular iOS Apps of All Time. (2016). This article reveals the 10 most downloaded iOS applications of all time.
- [7] Robert Epstein. 2016. Google Is the World's Biggest Censor. (2016). This US News article highlights the power Google has over Internet traffic.
- [8] Nir Eyal. 2012. Want To Hook Your Users? Drive Them Crazy. (2012). This TechCrunch blog post covers some software design strategies outlined in Eyal's book more concisely.
- [9] Nir Eyal. 2014. Hooked: How to Build Habit-Forming Products. (2014). This book by Nir Eyal covers some key addictive design methods.
- [10] Tristan Harris. 2016. How Technology Hijacks People's Minds. (2016). This essay by Tristan Harris explores how software exploits human nature.
- [11] Hoekman, Robert and Jared Spool. 2009. Web Anatomy: Interaction Design Frameworks That Work. (2009). This book defines infinite scrolling in a concise manner.

- [12] Iyengar, Sheena S. and Mark R. Lepper. 2000. When Choice is Demotivating: Can One Desire Too Much of a Good Thing? (2000). This paper explores the drawbacks of excessive choices.
- [13] Nathan Johnson. 2012. How does Facebook achieve infinite scrolling? (2012). This Stack Overflow answer describes some of the technical aspects of infinite scrolling as well as where it came from.
- [14] Harri Sarsa Juho Hamari, Jonna Koivisto. 2014. Does Gamification Work? A Literature Review of Empirical Studies on Gamification. (2014). This paper reviews empirical studies on gamification.
- [15] Dan Ariely Michael I. Norton, Daniel Mochon. 2011. The IKEA Effect: When Labor Leads to Love. (2011). This Harvard Business paper explores the Ikea effect and its business implications.
- [16] N/A. 2017. Dictionary.com. (2017). This site is the source of many widely accepted definitions found throughout this paper.
- [17] J. Odell. 2011. Once Facebook launches timeline, you'll never want to leave. (2011). This news article covers some of the features of Facebook Timelines shortly after it was released.
- [18] University of Queensland. 2017. What is Psychology? (2017). This web page defines psychology and explores how it is studied and researched across the world in academic environments.
- [19] Noam Scheiber. 2017. How Uber Uses Psychological Tricks to Push Its' Drivers Buttons. (2017). This *NY Times* article covers the gamification of Uber from the drivers perspective.
- [20] Honey Singh. 2017. Top 250 list of twitter clones sites. (2017). This blog post counts 250 websites with similar functionality as Twitter.
- [21] Greg Sterling. 2016. Nearly 85 percent of smartphone app time concentrated in top five apps. (2016). This article covers reports that found users spend 85% of their time on their phone using their top five apps.
- [22] Rahul Varshneya. 2014. 6 Techniques to Effectively Gamify a Mobile App. (2014). This blog post outlines gamification methods for app developers.

Originally published as: Neyman, Chauncey. "A Survey of Addictive Software Design" *Article 1* (2017): 1-12.
<https://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1127&context=cscsp>

Why Your Internet Habits Are Not as Clean as You Think

by Sarah Griffiths

It's probable you've already replied to a couple of emails today, sent some chat messages and maybe performed a quick internet search. As the day wears on you will doubtless spend even more time browsing online, uploading images, playing music and streaming video.

Each of these activities you perform online comes with a small cost – a few grams of carbon dioxide are emitted due to the energy needed to run your devices and power the wireless networks you access. Less obvious, but perhaps even more energy intensive, are the data centres and vast servers needed to support the internet and store the content we access over it.

Although the energy needed for a single internet search or email is small, **approximately 4.1 billion people, or 53.6% of the global population, now use the internet.** Those scraps of energy, and the associated greenhouse gases emitted with each online activity, can add up.

The carbon footprint of our gadgets, the internet and the systems supporting them account for about 3.7% of global greenhouse emissions, according to some estimates. **It is similar to the amount produced by the airline industry globally,** explains Mike Hazas, a researcher at Lancaster University. And these emissions are predicted to double by 2025.

If we were to rather crudely divide the 1.7 billion tonnes (1.6 billion tons) of greenhouse gas emissions estimated to be produced in the manufacture and running of digital technologies between all internet users around the world, it means each of us is responsible for 414kg (912lbs) of carbon dioxide a year.

But things are not that simple – this figure can vary depending where in the world you are. Internet users in some parts of the globe will have a disproportionately large footprint. One study estimated that 10 years ago, the average Australian internet user was responsible for the equivalent of 81kg (179lbs) of carbon dioxide (CO₂e) being emitted into the atmosphere. Improvements in energy efficiency, economies of scale and use of renewable energy will doubtless have reduced this, but it is clear that people in developed nations still account for the majority of the internet's carbon footprint. (CO₂e is a unit used to express the carbon footprint of all greenhouse gases together as if they were all emitted as carbon dioxide).

For some, the realisation that their online activity is harming the planet has spurred them into taking action.

“Anything we can do to reduce carbon emissions is important, no matter how small, and that includes how we behave on the internet,” says Philippa Gaut, a teacher from Surrey, UK. She is one of a growing number of eco-conscious consumers trying to

reduce their environmental impact online and on their phones. “If everybody made changes, it would have more impact,” she adds.

One of the difficulties in working out the carbon footprint of our internet habits is that few people can agree on what they should and should not include. Should it include the emissions that come from manufacturing the computing hardware? And what about those from the staff and buildings of technology companies? Even the figures around the running of data centres are disputed – many run on renewable energy, while some companies buy “carbon off-sets” to clean up their energy use.

In the US, data centres are responsible for 2% of the country’s electricity use, while globally they account for just under 200 terawatt Hours (TWh). According to the United Nation’s International Telecommunications Union, however, this figure has flatlined in recent years despite rising internet traffic and workloads. This is largely because of improved energy efficiency and the move to centralise data centres into giant facilities.

But while many companies claim to power their data centre’s using renewable energy, in some parts of the world they are still largely powered from the burning of fossil fuels. And it can be difficult for consumers to choose which data centres they want to use. Many of the major cloud providers, however, have pledged to cut their carbon emissions, so storing photos, documents and running services off their servers where possible is one approach to take.

As an individual, simply upgrading our equipment less often is one way of cutting the carbon footprint of our digital technology. The greenhouse gases emitted while manufacturing and transporting these devices can make up a considerable portion of the lifetime emissions from a piece of electronics. One study at the University of Edinburgh found that extending the time you use a single computer and monitors from four to six years could avoid the equivalent of 190kg of carbon emissions.

Eco-messaging

We can also alter the way we use our gadgets to cut our digital carbon footprints. One of the easiest ways is to switch the way we send messages.

Perhaps unsurprisingly, the footprint of an email also varies dramatically, from 0.3g CO₂e for a spam email to 4g (0.14oz) CO₂e for a regular email and 50g (1.7oz) CO₂e for one with a photo or hefty attachment, according to Mike Berners-Lee, a fellow at Lancaster University who researches carbon footprints. These figures, however, were crunched by Berners-Lee 10 years ago. Charlotte Freitag, a carbon footprint expert at Small World Consulting, the company founded by Berners-Lee, says the impact of emailing may have gone up.

“We think the footprint per message might be higher today because of the bigger phones people are using,” she says.

Based on the older figures, some people have estimated that their own emails will generate 1.6kg (3.5lb) CO₂e in a single day. Berners-Lee himself also calculated that a typical business user creates 135kg (298lbs) CO₂e from sending emails every year, which is the equivalent of driving 200 miles in a family car.

But it should also be easy to cut this down. By simply stopping unnecessary niceties such as “thank you” emails we could collectively save a lot of carbon emissions. If every adult in the UK sent one less “thank you” email, it could save 16,433 tonnes of carbon a year – the equivalent to taking 3,334 diesel cars off the road, according to energy company, OVO.

“While the carbon footprint of an email isn’t huge, it’s a great illustration of the broader principle that cutting the waste out of our lives is good for our wellbeing and good for the environment,” Berners-Lee says.

Swapping email attachments for links to documents and not sending messages to multiple recipients are another easy way to reduce our digital carbon footprints, as well as unsubscribing from mailing lists we no longer read.

“I unsubscribed from automatically generated newsletters, as when I learned about the carbon footprint from emails, I was horrified,” says Gaut. “Now, I’m careful not to send out my email to new websites... it’s made me consider the impact more.”

According to estimates by antispam service Cleanfox, the average user receives 2,850 unwanted emails every year from subscriptions, which are responsible for 28.5kg (63lbs) CO₂e.

Choosing to send an SMS text message is the perhaps the most environmentally-friendly alternative as a way of staying in touch because each text generates just 0.014g of CO₂e. A tweet is estimated to have a footprint of 0.2g CO₂e (although Twitter did not respond to requests to confirm this figure) while sending a message via a private messaging app such as WhatsApp or Facebook Messenger is estimated by Freitag to be only slightly less carbon intensive than sending an email. Again this can depend on what you are sending – gifs, emojis and images have a greater footprint than plain text.

The carbon footprint of making a one-minute mobile phone call is a little higher than sending a text, according to Freitag, but making video calls over the internet is much higher. One study from 2012 estimated that a five-hour meeting held over a video conferencing call between participants in different countries would produce between 4kg (8.8lbs) CO₂e and 215kg (474lbs) CO₂e.

But it is important to remember where it replaces travel to reach meetings, it can be far better for the environment. The same study found the video conferencing produced just 7% of the emissions of meeting in person. Another study found “the impact of a car ride exceeds the impact of a video conference at less than 20km”.

[...] Those who have been tempted by cryptocurrencies might also want to think carefully about the environmental impact of the transactions they conduct. Vast amounts of computing power are needed for the so-called “proof of work” algorithm that is used to validate transactions on Blockchain's distributed ledger system. One recent study estimated that **BitCoin alone is responsible for around 22m tonnes of carbon dioxide emissions every year – greater than all the carbon footprint of the whole of Jordan.**

Beating boredom

Watching online videos accounts for the biggest chunk of the world's internet traffic – 60% – and generates 300m tonnes of carbon dioxide a year, which is roughly 1% of global emissions, according to French think tank, The Shift Project. This is because,

as well as the power used by devices, energy is consumed by the servers and networks that distribute the content.

“If you flip on your television to watch Netflix, around half the power goes into powering the TV and half the energy goes into powering Netflix,” says Lancaster University’s Mike Hazas. Some experts, however, insist that the energy needed to store and stream videos is less than more intensive computational activities performed by data centres.

Some of the climate pollution that comes from internet use also comes from some rather dirty browsing. **Pornography accounts for a third of video streaming traffic, generating as much carbon dioxide as Belgium in a year.**

On-demand video services such as Amazon Prime and Netflix account for another third while the final third of the video streaming carbon footprint includes watching YouTube and clips on social media. Netflix says its total global energy consumption reached 451,000 megawatt hours per year, which is enough to power 37,000 homes, but insists it purchases renewable energy certificates and carbon offsets to compensate for any energy that comes from fossil fuel sources.

Streaming and downloading music also has an impact. Rabih Bashrouh, a researcher at the University of East London and lead scientist at the European Commission-funded Eureka project, calculated that **five billion plays clocked up by just one music video** – the hit 2017 song Despacito – **consumed as much electricity as Chad, Guinea-Bissau, Somalia, Sierra Leone and the Central African Republic put together in a single year.** “The total emissions for streaming that song could be over 250,000 tonnes of carbon dioxide,” he says.

However, Hazas points out that some YouTube views are unintentional. A study led by his colleague Kelly Widdicks analysed streaming habits and found that some viewers use YouTube as background noise, and sometimes even fall asleep, generating carbon for no gain. Cutting back on these uses or stopping video from playing unintentionally on an open browser when you are not watching, could help keep your carbon footprint down.

Fiddling with autoplay settings and switching from high definition to a lower resolution when it’s not necessary can also make a difference. Hazas says the most efficient way to see your favourite programme is by waiting for it to be on terrestrial TV, or choosing to stream it over wi-fi rather than on a mobile network can also make a difference.

“Using a phone over a mobile network is at least twice as energy intensive than using it over wi-fi, so if you can wait until you get home to watch YouTube that’s best,” he adds. And, one of the most enjoyable ways to be more environmentally friendly is to watch films and TV together.

“On the whole, audio is less problematic,” says Hazas, as streaming audio is less energy and carbon intensive than streaming images. But researchers at the University of Oslo found that environmental impact of listening to music has never been higher, with a footprint of 200,000-350,000 tonnes of CO₂e in the US alone for downloading tracks onto MP3 players. It’s thought emissions for streaming services may be even higher.

However, the number of times you listen to a piece of music can make a difference. Buying a physical CD or record can be better if you listen to the same album

repeatedly, but if you only listen to a piece of music less than 27 times over your lifetime, then streaming can be better.

Similarly, the environmental cost of downloading video games is thought to be higher than producing and distributing Blu-Ray disks from shops. The first attempt to map the energy use of gaming in the US found it produces 24 megatonnes of carbon dioxide a year. Researchers behind the study at the University of California found **US gamers use 2.4% of their household electricity – 32 terawatt hours of energy every year – which is more than freezers or washing machines**. They also showed that streaming games uses more energy, so gaming carbon emissions may worsen as more people adopt games where the computational work is being done remotely rather than on individual consoles, such as with devices like Google's Stadia.

But Hazas is more optimistic. "The carbon footprint of playing multiplayer games like Fortnite isn't too bad," he says. "They are designed to be responsive so they don't require too much data traffic. For example, you get a position of a character on a map, or the fact someone's shooting, but it doesn't take too much data to communicate that."

However, updating games is more carbon intensive. "Flagship games like Fortnite or Call of Duty require lots of updates so you're looking at gigabytes every couple of weeks for downloads, which add new features."

For those who enjoy flicking through their social media, there is some good news. It is arguably the least carbon intensive form of digital entertainment. According to Facebook's sustainability report, a user's annual carbon footprint is 299g CO₂e, which is less than boiling the water for a pot of tea. But if you consider the platform has more than one billion users, that's a lot of pots of tea.

It's possible to save carbon by disabling some features for social media and other apps.

"We've found that app updates and automatic cloud backups are about 10% of traffic from mobile phones," says Hazas. "So, switching off unnecessary cloud backups and switching off automatic downloads for app updates are good things to do."

But while changes in our personal online behaviour will only take us so far, there also needs to be change within the industry to ensure that carbon emissions can be reduced, says Elizabeth Jardim, a senior corporate campaigner at environmental campaign group Greenpeace. **The IT industry's greenhouse gas emissions are predicted to reach 14% of global emissions by 2040** but at the same time the UN's International Telecommunication's Union has set the industry the target of reducing its emissions by 45% over the next decade.

Previously published online: Griffiths, Sarah. "Why your internet habits are not as clean as you think." *BBC*. 5 March 2020. <https://www.bbc.com/future/article/20200305-why-your-internet-habits-are-not-as-clean-as-you-think>

Surge in Digital Activity has Hidden Environmental Costs

by Mike Cummings

Increased internet usage during stay-at-home orders triggered a demand for over 42 million megawatts per hour of additional electricity, a Yale study reports.

During the COVID-19 pandemic people across the world have adopted increasingly digital lifestyles. They stream movies, attend Zoom meetings, and sweat through online exercise classes. Many of them, however, are unlikely to consider the environmental impact of this behavior.

A new Yale-led study accounts for the hidden environmental footprint of this surge in digital activity, estimating its carbon emissions, water consumption, and land usage.

Published in the journal *Resources, Conservation, and Recycling*, the study estimates that internet usage increased by up to 40% worldwide following the issuance of stay-at-home orders from January through March 2020 as the virus spread. According to the study, this spike in online activity triggered a demand for up to 42.6 million megawatt-hours of additional electricity to support data transmission and to power data centers — the buildings that house the hardware and data of computer networks, cloud services, and digital applications.

If the world is to transition to a green economy, the authors assert, then these often-overlooked environmental costs must be fully exposed and addressed.

“The pandemic-related switch to digital has important environmental benefits, such as the reduction of travel-related carbon emissions, but the transition to a more digitally-centered world is not as clean as one might think,” said Kaveh Madani, the Henry Hart Rice Senior Fellow at the Council on Middle East Studies at Yale’s MacMillan Center for International and Area Studies, who led the study. “We want to provide people with the information they need to make good choices, so they don’t develop habits that harm the environment and are difficult to break.”

The other collaborators are from Purdue University and MIT.

If remote working and other physical distancing requirements were to continue through 2021, an additional 34.3 million tons in emissions of carbon dioxide and other greenhouse gases would be generated worldwide, the study forecasts. To offset that would require a forest twice the size of Portugal, the study says. The amount of water consumed would fill 317,200 Olympic-size swimming pools. (Water is used in the generation of electricity and to cool servers and other hardware.) And the land footprint, which includes the area needed to produce the required energy for data processing and transmission, would be the equivalent of the city of Los Angeles.

These rough estimates are based on data reported by individual countries and specific service providers. For example, Netflix reported a 16% spike in daily traffic between January and March 2020. Zoom, the nearly ubiquitous digital meeting platform, reported a tripling of daily usage after initial pandemic-related shutdowns in the United States.

The study recognizes that the changes in internet use do not cause linear changes in energy use and environmental footprints. Yet, the researchers say they hope that their estimates — based on limited available data at the global scale — will encourage researchers, internet users, regulators, and service providers to more carefully examine the overlooked environmental impacts of the internet sector.

Madani and his coauthors urge service providers, including firms that provide cloud-based storage services, and application-based companies — such as YouTube, Zoom, Instagram, Facebook, Twitter, Microsoft, Amazon, TikTok, and Netflix — to continue taking steps to improve efficiency and reduce their energy. But they also call on them to work toward limiting the environmental impact of their products and to share information about their environmental footprints with users.

In addition, they urge policymakers to require digital companies to be transparent about the environmental footprints of their products and enact measures to curb their environmental impact.

There is also role for consumers, who can collectively reduce the internet's environmental footprint and promote sustainability by adopting responsible online behaviors, the researchers said. For example, whenever possible, consumers can lower the quality of streaming video quality from high definition to standard. If 70 million streaming subscribers lowered the quality of their video, it could reduce monthly greenhouse gas emissions by up to 3.5 million tons — the equivalent of eliminating 6% of monthly coal consumption in the United States, according to the study.

“It’s about developing responsible behaviors, like switching off the lights in an empty room,” Madani said. “That’s the spirit of our message. Digital products are constantly improving in quality, but we have power over how we use them. Perhaps you don’t need to stream every movie in HD. Perhaps consider switching off the video function during a Zoom meeting when possible. Each of these behaviors can have a big impact collectively.”

Previously posted online: Cummings, Mike. “Surge in digital activity has hidden environmental costs.” *Yale News*. 27 January 2021. <https://news.yale.edu/2021/01/27/surge-digital-activity-has-hidden-environmental-costs>

A Dark and Hungry God Arises: Technology and Its Captives

by Green Anarchy

The historical object of industrialization, its profound truth which the 20th century has made manifest, is destruction: Auschwitz and Hiroshima are the two fronts on which the present era was baptized.

—David Watson

In the course of history there have always been different principles of civilization according to regions, nations, and continents. But today everything tends to align itself on technical principles. In the past, different civilizations took different “paths”; today all peoples follow the same road and the same impulse. This does not mean that they have all reached the same point, but they are situated at different paths along the same trajectory. All the business of life, from work and amusement to love and death, is seen from the technical point of view. The number of “technical slaves” is growing rapidly, and the ideal of all governments is to push as fast as possible toward industrialization and technical enslavement.

—Jacques Ellul, *The Technological Society*

While our earliest ancestors lived fully in the natural milieu, and our most recent forebears in a more continually-domesticated social milieu, post-modern humans now live primarily in what sociologist Jacques Ellul called a *technological milieu*.

Analogous in scale and planetary significance to the atmosphere, lithosphere, or biosphere, a truly global *technosphere* is in an aggressively-ongoing process of development around the planet, like an artificial sheath of technology that’s emerged from the activities of civilization and its global financial markets and military-industrial complex, and which now encircles the globe with its planet-girding information/satellite network. Here in the early years of the 21st century, we find ourselves involved in a war between technosphere and not only biosphere but also *ethnosphere*, for cultural diversity is as endangered as biological diversity under the relentless technospheric advance.

Lewis Mumford, a pioneering historian of technology, traced its evolution from the predominant use of water, wind, and wood in the pre-industrial “eotechnic” era, through the rise of centralized factories for mass production using coal and iron (the “paleotechnic” era), through the 20th century’s technics, dominated by alloys and electricity (what he termed “neotechnics”). Presently, with global communications networks and off-planet satellites, the reach of the technosphere continues to increase, as machines approach molecular size in the hands of the nanotechnologists, and genetic engineers decipher and change the DNA blueprint underlying life and speciation itself.

For post-modern humans it is the technosphere, not Earth or even other people, that is the source of their livelihood, food, energy, education, entertainment, and identity; if we despair because our lives have become little more than a frenzy of meaningless multi-tasking, our rulers' solution is to change us so we conform with their dehumanizing technological system—and so change us they have! In the US alone, over fifty million of us are on psychotropic medication just to get through the work day. About the same number of us are on medication to try and get through the night. And five million of our kids are on mind-eroding pharmaceuticals to get through the school day. Not to worry if the medication is required at ever-higher doses or stops working altogether, or if you've chosen instead alcohol or illegal drug addiction; the genetic engineers promise us that genes for depression, anxiety, alcoholism, and even shyness will soon be found and removed. And it is the awareness repressed by this collective degeneration that tends to fuel the entire cycle of resignation and extinguish the will to resist.

We've already substituted "virtual communities" for the relationships, kinship, and neighborhoods lost in our full-time devotion to technology. Numerous computer scientists eventually hope to make us all "virtual" by downloading us into silicon chips, making us "one" with our computerized office machinery. This will be the final solution to the technological dilemma and the ultimate proclamation that life has been fully conquered. Our rulers can preserve their mechanized production-based System only by fundamentally changing who we are, by prodding us to *become technology ourselves*. This is exactly what we *already are* becoming within the infrastructure of the techno-industrial system: our existence entirely dependent, artificial, and parasitic; our behavior standardized to the internal logic of the machine and to the mechanisms that one needs for anything; our food without aroma or flavor; our ideas conformed to the flux of images and slogans that electronic communication constantly injects into us, feeding our mental universe—our own dreams becoming rancid rainbows. The technosphere, then, is not merely exploiting and wasting the natural and social milieus; it is fundamentally remaking the natural world and the human animal in technology's image. Life and reality itself are being absorbed into the technosphere and being reduced to mere components in the larger System.

Given the scope and pace of the technological takeover, the time for meaningful resistance is growing short...

Originally from:

Green Anarchy (from *Uncivilized: The Best of Green Anarchy* 2012)

I am Not a Machine, I am a Human Being: Technology as Mediation

by Mia X. Kursions

[Jerry Mander]...it struck me that there was a film between me and all of that. I could "see" the spectacular views. I knew they were spectacular. But the experience stopped at my eyes. I couldn't let it inside me. I felt nothing. Something had gone wrong with me. I remember childhood moments when the mere sight of the sky or grass or trees would send waves of physical pleasure through me. Yet now... I felt dead. I had the impulse to re-peat a phrase that was popular among friends of mine, "Nature is boring." What was terrifying even then was that I knew the problem was me, not nature. It was that nature had become irrelevant to me, absent from my life. Through mere lack of exposure and practice, I'd lost the ability to feel it, tune into it, or care about it. Life moved too fast for that now...

I am reasonably unsure where I (in the purely egoist sense) end and **everything else begins**. It is somewhat vague and amorphous, and, well, subjective. I don't mean to sound like a fucking hippie here, but as I search for an authentic and unmediated life free of (or at least minimizing) alienated circumstances (from myself, others, and the world around us), the edges and essences of who I am (and who I am not) must be examined. One thing I will say with a fair amount of measurable conviction, is that ***I am not a machine...*** I will not confine what I am intimately connected with to those people with whom I have a formal relationship, nor exclusively humans, nor those animals with vertebrae, nor that which we typically consider "alive"—as some have suggested, "stones can speak", and therefore they may also listen, act, and emote. I am thrilled to explore these possibilities and peculiarities. But, when it comes to "technology",¹²⁶ or the deadness of space it controls (physical, psychological, and institutional), I have no delusions (nor futuristic orgasmic revelations) of connection to it, nor its supposed benign neutrality (nor naturalness). I will utilize the technological infrastructure and some of its segments where and when I feel that I, or a collaborative effort, can have a momentary benefit for an immediate or a long-term process within, or despite, technology's overall and inevitable dominance and degradation (ie using a computer to put out a publication critiquing and strategizing against civilization). Ultimately, it is impossible to reject the idea that technology is an unhealthy conglomeration or system of tools not designed for my

¹²⁶ "Technology" is used in quotes, because it is not a simple word with a simple definition, despite those who wish to fix it for everyone based on their own biased understanding of history. Even in the common usage of the term there is much incongruence. While this essay may shed light on the author's particular usage, the meaning still seems somewhat amorphous and contextual. In this context, it is generally used to describe the complex system of tools and techniques that separate ourselves from direct experience, and the ideological and institutional logic which perpetuates and maintains these systems. It is an ideology of technique, systematic treatment, and progressive industrial science.

support or health, controlled and motivated by an inorganic and anthropocentric mindset of control, efficiency, and order. It is an incredibly powerful network of domination projected by the concept of progress and separation. Technology has determined the circumstances of our world more than any other single factor (capitalism, racism, government, theology, etc). It literally creates the physical, social, and psychological playing field in which all forms of domination function. It makes the rules, and perpetually re- writes them based on its own self-referential logic.

Technology is the religion of our time, and as it has a staggeringly comprehensive control of our minds, bodies, and spirit, **it must be destroyed**¹²⁷ if we are to live unmediated and unrestrained lives. Technology's devastating influence is vast, but for the sake of brevity and focus, I choose not to dwell on the ecological devastation caused by the production, development, functioning, and perpetuation of technologic society, nor the toxicity it creates (that which is killing all of us on the cellular and genetic level). The impact in this realm is well documented and understood, and the wide-spread comprehension of these factors, while extremely relevant (soberingly so), has not altered the trajectory of the technologic nightmare in the least. In fact, those who dwell exclusively in the realm of "environmental impact", seem at best to argue only for a more "sustainable", "greener", and "compassionate" technology— a solar powered police state which never questions basic assumptions of civilized relations. This only strengthens the technological society by adapting its infrastructure (or mere facade) to popular trends and tendencies, extending its existence. And, although the production aspects in a technologically-driven society, as well as the workers manipulated and coerced into its functioning, is another valuable subject to explore, the topic is huge, and one, I might add, that has been addressed with much more potency and immediacy than I could offer.

The questions I prefer to ask have more to do with technology's impact and effect on the personal and the social in reference to alienation, technological dependence and addiction, spiritual and emotional unhealth, shifts in perception of time and space, automation, technology's ever-strengthening control, and the trajectory towards cybernetic neo-lives. Recognizing the contradictions we face, and possible directions ahead, are also of immense importance to our particular situation as civilized humans at the beginning of the 21st Century, longing for a completely different, non-technocratic world.

[Jerry Mander] As humans have moved into totally artificial environments, our direct contact with and knowledge of the planet has been snapped. Disconnected, like astronauts floating in space, we cannot know up from down or truth from fiction. Conditions are appropriate for the implantation of arbitrary realities.

Alienation is the method or state of being separated from something (or everything) we were once (or intrinsically) connected to. Personal and social alienation is inherent in the technological process.

This disconnect from life is the primary source of our condition of domestication, without which it would be much harder (even impossible) to manipulate and control us. This has always been the principle mode of control. Separate people from their land and recontextualize them through methods, processes, and techniques they are unfamiliar

¹²⁷ It is understood that "technology" cannot be merely destroyed in the physical sense, like you can destroy a car or television. To "destroy technology" is to analyze, understand, critique, abandon, and attack all of the institutional, cultural, and personal manifestations of the technological system. It is no easy feat.

with; insulate them from who they are. It is precisely because we are floating through the world without connections to the actual substance of life, that we can be tied to and driven by external agendas and artificial pushes and pulls. Technology is the primary source of this alienation, in every sector of our lives. In an ever-expanding process, the world has been constructed to limit our connections outside the technological paradigm. What aspects of our life are not directly linked to the technological process? Are there any forms of “connection” between people that are not mediated through technological means?

On the personal level, our lives become alienated through clocks, pharmaceuticals, microwaves, processed food, television, white noise, concrete, machinery, computers, electric lighting, air conditioning...On the social level, we are alienated from each other through telephones, email, pop culture, ipods, highways, housing developments, voting booths, spectacles...At this point in civilization’s trajectory, it is difficult for most to even comprehend an unmediated (and non-technological) existence; with those who can still imagine such a reality labeled as wingnuts and extremists. But within the logic of this technological nightmare, those of us who are nevertheless able to conceive of another set of relationships are truly mad, and the only response, according to its paradigm, must be extreme. But within another context, that of an uncivilized reality, we are sane and ordinary. We are humans *being*.

[Jerry Mander] What we see, hear, touch, taste, smell, feel, and understand about the world has been processed for us. Our experiences of the world can no longer be called direct, or primary. They are secondary, mediated experiences...We are surrounded by a reconstructed world that is difficult to grasp how astonishingly different it is from the world of only one hundred years ago, and bears virtually no resemblance to the world in which humans beings lived for four million years before that...At the moment when the natural environment was altered beyond the point that it could be personally observed, the definitions of knowledge itself began to change. No longer based on direct experience, knowledge began to depend upon scientific, technological, industrial proof...Now they tell us what nature is, what we are, how we relate to the cosmos, what we need for survival and happiness, and what are the appropriate ways to organize our existence... As we continue to separate ourselves from direct experience of the planet, the hierarchy of technoscience advances...The question of natural balance is now subordinated. Evolution is defined less in terms of planetary process than technological process.

Forcing technological dependence and addiction is the modus operandi of the techno-driven society we inhabit. Dependence is the state of being influenced or determined by, reliant and conditional upon, something other than oneself. Addiction is to give up or over to an external source. Within the technological society, we give up ourselves. We trade our lives for a detached reality, for what we are told will be better days. Safety and comfort. New and improved. The first one’s free. With each neoteric step taking us further. Up, up, and away. Until we can’t live without all the previous steps. We can’t imagine a world without them. We are hooked. Habituated with progress, we become codependent with technology. We no longer trust our intuition or instincts. Our personal observations become suspect, not only to the logic of the system, but even to ourselves, unless they are corroborated by scientific or technological institutions. But, what compels us to want a more technified life? What personal emptiness drives this?

What social pressures push this? Is there a physical dependency? And, perhaps most important, is recovery possible?

[Jerry Mander] The growing incidences of mental illness these days may be explained in part by the fact that the world we call real and which we ask people to live within and understand is itself open to question. The environment we live in is no longer connected to the planetary process which brought us all into being. It is solely the product of human mental process... We are left with no frame of reference untouched by human interpretation.

Predominating spiritual and emotional unhealth is one clear indication that the current set-up is failing humans. Spiritually and emotionally strong and vigorous beings that can form deep independent and collective connections with the world are discouraged by a mechanistic, utilitarian, and materialist driven world. We get our food from sanitized supermarkets, our water from bottles or piped in from chlorinating treatment centers, our emotional support from specialists with degrees on their walls and Internet chatrooms, and our sexual gratification from porn sites or online dating (or not at all). Our emotions are either sporadically jerked from all directions, or dulled to languid nothingness, while spirituality is perversely funneled into ideological and dogmatic institutions instead of real lived experience.

The robustness and richness of life has been lost to the monotony of cold routine and ritual. In a our schizophrenic state, we must choose between a world to which we have no authentic connection, one which appears to us to be arbitrarily constructed, or a world outside of these processes, isolated from the technological society. But with our domesticated logic, which has not been allowed to develop in an organic and connected way, this is painfully difficult, often causing emotional swings ranging from ungrounded elation to deep depression. Confusion, delusion, apathy, isolation, and masochism occur on both sides of this dilemma. We are left painfully asking ourselves, (if we are able to break from our frenzy or wake from our stupor), “what is missing”? What social factors push this? What are the implications? Is there hope outside of self-help philosophies and New-Age pseudo-panaceas?

[Jerry Mander] It is obvious that plants are alive in more or less the way humans and other animals are. Our failure to see plants as living creatures, and appreciate ourselves as some kind of sped-up plant, is the result of our limited human perception, a sign of the boundaries of our senses or the degree to which we have allowed them to atrophy... We have become too speedy to perceive the slower rhythms of other life forms... Pretechnological peoples do not have to go through a slowing-down process. Surrounded by nature, with everything alive everywhere around them, they develop an automatic intimacy with the natural world... No sense maintains itself if not used. If a sense remains unused, it atrophies.

Alterations in our perception of time and space shift as technological society expands. Since time is merely an abstract division of our lives into “usable” portions, the context it is measured from determines its characteristics. Domestication’s timing is one of linearity, moving away from the Earth’s, and our own, cyclical timing. Rhythms change from multi-layered and complexly contrasting and reinforcing to mechanistic, sharp, and singular. Technological society is in a constant state of acceleration, with the momentum of all previous developments behind it. With the force of this push, it becomes harder at each moment to slow down. While pockets of rest do occur, they are mere bubbles, after which the breakneck speed of the technological infra- structure persists. We become so used to this constant acceleration that it feels customary to us. We become more comfortable with the pace and methodology of technology. We start to mimic more and more of the artificial systems that “inhabit” our world. The computer

becomes more of a system we relate to than any biological one. Our cars become our friends, and our cellphone an extension of ourselves. We begin to view them as indispensable. Communication is instantaneous across the globe, distorting all relationships, and collapsing our perception of lived space. We can chat with someone we will never meet in Brazil or we can eat sushi in Japan in a matter of hours. We not only experience space like never before, but our transit from place to place becomes unrelated exobiological points plotted on a map, rather than a lived experiential connection through the world. Our perception of these changes get blurred further and further as our relationship to time becomes more rapid. Our lives ticking away faster and faster, yet nothing seems to happen quick enough for us and there are so many places to go. We are profoundly ungrounded. How does this ever-quickening and shrinking perspective of the world affect our lives and our relationships? How does it transform and distort our internal rhythms?

[Jerry Mander] It would be going too far to call our modern offices sensory-deprivation chambers, but they are most certainly sensory-reduction chambers. They may not brainwash, but the elimination of sensory stimuli definitely increases focus on the task at hand, the work to be done, the exclusion of all else.

As we move from the life-based time of the eternal present to the planned time of the perpetual future, automation and specialization replace spontaneity and shared experience. Through automation, technology supersedes authentic experience and relationships. Automation controls and limits through systematic apparatus or process, turning action from a willed and free motion to a mechanical and involuntary response. It removes all life from activity. With the expansion of mass society, instrumental reason generates more advanced forms of labor division. The standardization and mechanization of the world becomes the norm, while organic and human-scale communities based on face-to-face and direct relationships disappear. We become cogs, or specialists, in a larger machine. Parts must submit to the logic of the whole. Our lives become a string of tasks for our accomplishment. We lose perspective on anything outside of these short-term and system-defined goals. We begin to lose our ability to even conceive of approaching the world outside of this method, and the ability to be self-reliant or independent from the system. Can we even begin to imagine what we might be losing in the automated process?

[Jerry Mander] Anything connected to natural ("savage") awareness must be ridiculed and eliminated, and all experience must be contained within controlled artificial environments. In a large society, technology is a good standardizer, and confinement works best if technology has been enshrined...As technology has evolved, step by step, it has placed boundaries between human beings and their connections with larger, nonhuman realities. As life acquired ever more technological wrapping, human experience and understanding were confined and altered...until people's minds and living patterns are so disconnected that there is no way of knowing reality from fantasy. At such a point, there is no choice but to accept leadership, however arbitrary...Autocracy needn't come in the form of a person at all, or even as an articulated ideology or conscious conspiracy. The autocracy can exist in the technology itself. The technology can produce its own subordinated society.

Technology's control over us has reached the status of super-god. It is no longer enough to ask the question "should we have technology?" or to examine its positive or negative attributes. It is ingrained in all of us on every aspect of our life, from womb to tomb.

And there are even those who wish to submit to this deity even after death. We bow, often unknowingly, but certainly with a disfigured anticipation, to this technothocratic altar. Every creation, every solution, every emotion, every social organization is processed through a technological principle, which will always feedback upon itself. So we need not be persuaded to “keep the faith”, since it is all that is available to us. Control is omnipresent, so brute force is rarely necessary. To most, resistance *appears* futile. Can we even recognize how deep the rabbit hole goes? And if we can, is our perception enough to break out of it? Is it possible to live a nontechnological life within this world?

[Jerry Mander] Noting that reality and its definitions have now entered the realm of game and are up for grabs, they become better at the game than anyone else, exploiting it, reshaping disordered, uprooted minds and tilling a new bed of mental soil from which monsters will inevitably grow.

The trajectory towards cybernetic neo-lives is not solely the desire for self-preservation and expansion by those controlling technological society, but also of its minions, believing they can be part of the super-god and intelligence of technology. Cybernetics moves towards an all-pervasive control over reality (both informational and physical), as it fully over-rides (yet mimics artificially) natural neuro-processes. It becomes the basis for a hybrid of biological, mechanical, and virtual systems. As we move toward an all-enveloping crisis on the environmental level, and as resources to run the technological system begin to dwindle (or at least become less efficient and profitable), the shift towards a world less restricted by material elements (and still plagued by human limitations) becomes the prospective direction. Through cybernetic research, along with biotechnology, the push to a colossal leap in evolution is proposed, and most are along for the ride, convinced that either this is the logical next step, that it is unavoidable, or that it is already too late. We are already witnessing the preliminary phases and most are quite open about this process. Is this civilization’s last hope and endpoint? What are the consequences of this? Why do people accept this scenario?

[Jerry Mander] In one generation, out of hundreds of thousands in human evolution, America had become the first culture to have [almost completely] substituted secondary, mediated versions of experience for direct experience of the world. Interpretations and representations of the world were being accepted as experience, and the difference between the two was obscure to most of us.

For those of us searching for a de-technified life, the contradiction of being both within technological society, and outside of it, is nearly unavoidable. Beyond running to the woods in a survivalist mode (which still has the dual problem of bringing our domesticated mind into that situation and that, in a shrinking world, escape is becoming less and less possible), in a technologically ubiquitous world, we must reconcile this situation in order to maneuver and seek its destruction. Just as a bankrobber may need to change clothes and hair, cover tattoos, wear make-up, and better understand the functioning and security of the financial institution they are targeting, so may we need to become more observant of the technological system, become proficient in some of its operations, and temporarily “fit in”. Since every aspect of our lives is so ingrained with technological processes and apparatus, it is crucial for us to be critical of those processes, yet decide which we are willing to become skilled in, to utilize them for temporary goals. This can be a painful course, and also contains the potential for a slippery slope, with technological dependence or fetishization becoming negative possibilities. On a theoretical and critical level, there is nothing about technology that is beneficial to the

human experience. But on a practical level, it seems somewhat necessary to have one foot in this world, although with extreme cynicism and caution, and certainly not exclusively, at the expense of authentic unmediated experience and practice. We must also be prepared to ask ourselves what it means, what are the consequences, of living this contradiction? And, how it can ultimately be destroyed?

[Jerry Mander] When people fully accept the idea that all reality exists solely in their own minds, and that nothing outside their minds is definitely, concretely real, each person then has unlimited personal power to create and define reality. It is now up for grabs. There is no cause. There is no effect. Relationships do not exist...In this denial of everyday worldly reality, all realities become totally arbitrary, creating the perfect precondition for the imposition of any new "ground of reality" within the void. Though it may be nonsensical or fantastic, any reality is acceptable...Reality becomes arbitrary only within the confines of a mental framework.

People who live in direct contact with the planet itself are not concerned with such questions.

Given our current reality, how can we begin to live differently? What could a less mediated, less technologically-dependent world look like for us here and now? Can we regain direct contact with our world? Does it just mean escape and isolation? How do we avoid postmodern complacency? Can there be a transition? These are all vital questions to ask ourselves, as we embark on a critique of, resistance to, and departure from this technologic nightmare that is worsening with each micro-second. While simply "going back" is not a possibility, the virus has been released and the techno-logic is everywhere, it is still encouraging that for most of our time on this planet, humans lived in direct connection with our world, without the mediating factors of technology and instrumental thinking. Perhaps our most significant lessons are here.

Despite the bleak outlook, our future is still unwritten, and while I still maintain an ounce of strength and free will, while I am still of flesh and blood and can still discover and connect to my passions and dreams, **I am sure that I am not a Machine, I am a human being.**

Previously published as: Mia X. Kursions, with self-established provocation from Jerry Mander¹²⁸ (from *Uncivilized: The Best of Green Anarchy* 2012).

¹²⁸ All italicized quotes above are from "Argument One: The Mediation of Experience," contained in Jerry Mander's *Four Arguments for the Elimination of Television* (William Morrow and Company, Inc. 1977). While the book is dated, and contains some liberal notions of democratic process, Mander addresses perhaps the most pervasive, popular, and damaging form of technology of his time, television, which could easily be viewed as the predecessor of a much more destructive and alienating aspect of the technological system, the Internet. The first section of his book, "Argument One", is the most impressive, as it deals very little with television per se, and addresses the much larger question of technology's inevitable qualities of mediation.

Seeds on the Breeze

by Scavenger

Most of the things I know, to be distinguished from the things I think, believe, accept, or contemplate, I have learned from non-humans. Trees, storms, herbs, rocks, rivers, and critters have taught me an inestimable amount about themselves, the world I inhabit, myself, and the ways that we all can and do interact. My deep-seated respect for these “teachers”, and for the significant humans I have learned from, is by personal necessity balanced by my understanding of the process of teaching and learning honestly and openly without the corruption of authority. Teaching and learning in this sense occur simultaneously, with all beings involved sharing knowledge and experience to broaden their own connection to the world.

Lest I seem to be merely redefining a hierarchical student/ teacher relationship in clouded language, I should clarify that my perception of knowledge, experience, and wisdom are irrevocably inter- twined, relying on mutual growth and understanding rather than a downwards transmission of “facts”. When I learned from an old box turtle the meaning of silence and hiding in plain sight or from New Mexico Vervain the true feelings of passion that occur in taking the life of another, there was not so much a lesson as a connection. When I speak of teaching/learning, or knowing, there is actually no distinction, no separation between the two beings and the experience they share. The question that arises from this experience is how to live constantly in this exchange and interaction.

In this fractured and alienated society, experiencing a true community and the opportunity to teach, learn, and share are far too infrequent and awkward, accompanied by emotional and intellectual baggage that interrupts and confuses the experience.

Overcoming these obstacles can be a challenge, to say the least, even in circles sharing similar viewpoints about communication and experience. This challenge is a major factor in the rewilding process that many GA/AP folks are consciously undertaking and that countless other folks are engaging in other ways. The greater challenge is attempting to extend this to those outside of the cliques and communes— outreach, but not in the typical, organizational sense—to those who are in search of meaning or looking for a way to define their personal struggles with authority and civilization. I am suggesting that there is a tactical as well as honestly compassionate approach that exists in finding meaningful and effective ways of communicating the struggle against civilization to individuals we come across under circumstances that lend themselves to sharing understanding and experience.

For the past few summers I have spent a considerable amount of time working jobs that involve living in educational wilderness settings with teenagers who usually have personal conflicts regarding authority and a general attraction to the wilderness experience.

The conversations that I had with these folks, who generally have no conscious struggle with civilization, tend to fall very easily into areas such as passionate critique, active strategy and rewilding. Many times I have witnessed an alienated and anti-social

person (aren't we all in this civilization?) come out of their shell and catch a spark from a well-placed question or experience and follow through into a rant, personal struggle, or plan for action. The passion in these people is the core of this particular tactical consideration. Lecturing someone about civilization's problems is an inherently flawed approach—no one wants to hear another authority figure preaching about how (not) to live! The passion in the eyes of the oppressed fades quickly before the excitement of any kind of preacher. Instead, we can teach and learn like our wild brethren, allowing meaningful questions to be answered in few, simple, honest words and direct actions. It is crucial to remain centered on our own personal struggle, to live up to our words of resistance. Experience is by far the most effective method of direct teaching/learning, and sharing tactics and strategies as part of a critique is essential. There are some obvious security concerns here, so by all means be careful, but also be honest.

The inherent dishonesty that underlies all relationships and interactions within the context of civilization is a huge barrier to overcome. We have been carefully trained not to be honest with anyone, least of all ourselves. This is exactly why exposing one's self, "getting naked", so to speak, in front of others is such an effective strategy. When we begin to break down the barriers within where others can see the results, we impart the courage necessary for them to begin their own journey of rewilding. This is a process that has many names and can be found in many cultures, most explicitly in the oral folklore of trickster fools such as coyote and raven. In the field of outdoor leadership it can be seen as an extension of the method of leading by example; instead of leading by upholding some moral code, this open confrontation with the self inspires others not to act exactly as you do, but rather to express their own passions. Pushing the boundaries of our conditioning is an important internal process that can be greatly facilitated by working in a small group setting. This aspect of rewilding is essential for most other forms to take place in a meaningful way. What good is it to be an expert fire crafter or blade maker, hunter or forager if we cannot even communicate with ourselves honestly? Some desensitized humans may overlook our hypocrisy, but wild beings will know who we are. Brave words do not cover the scent of fear.

However we encounter situations with the potential for sharing knowledge, it is essential to stay open to the tactical possibilities for broadening the struggle against civilization. We are not a movement and we have no need for indoctrinated "recruits"; we are part of a wild and natural backlash of feral resistance. We are the dirt in the gears of a machine far too large and dangerous to confront directly—but rust spreads easily on shiny metal, creeping roots shatter the strongest cement, and dandelions can infiltrate the most manicured lawns.

Although I would be the last to recommend any job or work to anyone, it is understandable that some circumstances lead many of us to sell our time during parts of our lives. Seeking jobs that exist within wild settings I have found deep personal affinity and deep potential for expanding communication with alienated people who are not always sure why they find themselves at odds with the society around them. Upon reflection, it is easy to see why internal growth and deep healing is so possible in youth that volunteer or are sent to spend time in the woods with outdoor leaders to show them the "ways of the woods".

The change in surroundings, from having nothing in sight but walls and plastic, metal and sheetrock to having forest and sky, mountain and creek become the surroundings, is inherently healing. The artifice of our environment reflects the space that we occupy mentally, physically and spiritually. Wild spaces connect and revitalize, as

they are alive and open to communication. Look around you. Do you see right angles, flat walls, light bulbs that place you nowhere on Earth but firmly within the bowels of civilization or do you see the glint of a warm fire, towering trees or open deserts that remind you that you are in a specific bioregion; do you see plastic and metal shaped by slaves and used by slaves or do you see wild, living beings exchanging life and wisdom in an unending relationship? The psychological effects of existence within civilization are horrifying. Not only do they hold no life to reflect the lives of those trapped inside, they cut us off from each other and from the rest of the world in a very literal and direct way.

The physical aspects of rewilding are in many ways essential to creating the foundation for an honest relationship with the human and non-human beings we encounter in our lives. Earth skills and primitive knowledge create a solid base that allows us to know, not just think, but truly know that we don't need civilization. When I know that I can enter the forest or the desert and find food, make fire, locate water and communicate with whoever I find there, I have reduced the physical necessity in my life for the artifice of civilization. As mentioned before, the artifice that surrounds us reflects us and shapes our lives in very literal ways. To confront the mentality of civilization on an internal level however requires more than just learning some basic skills. It requires much, much more. Elite military forces often have some pretty solid skills in survival, even if they don't really know how to communicate with the wild spaces they encounter. Some of the most experienced and knowledgeable primitive skills enthusiasts I have read or met are locked into ideological religious beliefs and addictive civilized mentalities. Memorization and extensive learning can give the appearance of having a deep connection to the Earth, but there is a difference between knowing the names and medicinal uses of a thousand herbs and actually knowing even one of those plantbeings. Although the physical setting and surroundings are very helpful in the process of rewilding they must not be mistaken for completing the rewilding process, if such is even possible.

Honest rewilding is not only about breaking old patterns and addictions but just as importantly it is about fulfilling deeper needs. Rewilding is a path to learning self-sufficiency, living with meaning— finding joy and contentment with each day, seeking adventure and real entertainment. Connectivity with self, land and others fulfills me. Full connectivity needs no one family or one landscape, though honoring specific allies can certainly deepen the mutual experience. Identifying and responding to the deeper needs and urges that we feel when we allow them to manifest is an excellent beginning for the rewilding process. Eventually the impulse and our response become inseparable, and we reduce the levels of mediation within ourselves until they are no longer hindering our experience. I find it important to constantly critique and question where these deeper urges and needs arise from. For if the needs arose from the civilized mentality, from a lingering connection to the mindsets and physical manifestations, then the chain is not fully broken. Needs that exist within the mindset of civilization reflect the connection to that mentality. Deeper needs that do not reflect that connection are thus ever more difficult to locate and identify with. Yet they exist, and when we really disconnect from our training, we feel them calling us. When we enter wild places and see it reflected within us we feel these urges and the passion that come with it and we know that we are not alone. We feel it so strongly that we know there must be others who also feel them even if we don't see them or even know of them. Perhaps we read of them, or see glimpses in the pages of history, no matter how shoddily presented.

Some of those urges may seem dramatically different from one person to another. Defining our boundaries and what we accept in ourselves in others is one of the most fascinating aspects of creating a community life. The line of intolerance and the level of intervention that is acceptable are questions that we should continue to consider openly, for tyranny can exist just as surely within any small group as it can in vast states of consolidated power. The urge to live spontaneously and act on deep desires is not meaningless or trivial. Live your dreams in whatever way you can; live for yourself, and without even trying, you will become the most important type of teacher: one who inspires others to act upon their own deepest desires.

Rewilding in the context of an open community creates the setting for transition, for some patterns are already shattered. Connections are created spontaneously, laughter abounds, beauty overwhelms from so many aspects of life at once that even the physical strain, itself a crack in the dependence on so many comforts of living anywhere near the center of the machine, becomes a liberating and liberated behaviour. Addictive behaviours can safely crumble with no new addictions to be grasped for. Granted, addiction may be difficult to see sometimes, even within oneself, because of the many levels of alienation and oppression that we have been so carefully taught to self administer continue to pervade our experience of the world and poison our interactions. Honest communication is the only way to overcome these issues, and honest interaction with others maintains that honesty and keeps hypocrisy where it belongs—out in the open and being dealt with. I despise hypocrisy. That is why I accept that it exists within myself and confront it directly in as many ways as do not create greater hypocrisy. To deny its existence altogether is to be self-deceiving on some subtle level.

Rewilding is unplugging from within, breaking chains of perception, restraint, obedience and compliance. It is physical also—un- making addictions, not just staving them off but finding their roots and pulling them all the way out of the self, unraveling the shroud of fear that is wrapped tight around us even before we are born. It is about becoming what we were born to be; it's about becoming human in the way we choose and acting as we will, not simply as we can. Ironically that is one of the most common arguments against various forms of anarchy: that people will do whatever they want. The key to remember is that everyone will do what they want and not whatever they can. In a community of healing individuals there is an ongoing process of confronting oneself and others about all inconsistencies that minimize behavior that would be harmful to others. We call each other out, we call ourselves out, and we gradually become more whole as we remove ourselves from the shroud of fear, drifting free of constricting mindsets, boxes and borders.

Living in bands predates living in nuclear families by the vast majority of human existence, and the experience of collective living is found in many of the more fulfilling and meaningful organizations still in society. There cannot be said to be any true “natural” human state, certainly, as we are evolving and changing social creatures, but living in a band allows people to overcome much of the alienation and separation that the lifestyle of nuclear families and institutional interaction with others in schools and offices ensures and perpetuates. Living in a small group keeps people honest and open, promoting group dynamics wherein abusive behavior will be dealt with. I do not speak in universals, for surely a tyrant can monopolize power in a small group as surely as in a patriarchal family, but it is more difficult and less likely. I perceive such a group setting to have great potential for healing as well, especially in terms of overcoming alienation and insecurity. Surely I have seen how people come into such groups closed off and

insecure, yet within days of joining the group, even the shyest open up and begin laughing and shouting, playing and joking with the rest of the group. How often do you smile (and I damn well don't include faking it for customers) or laugh raucously while working a wage labor job? I remember all too well the institutional despondence that overwhelms everyone who works indoors, cut off from the source of life and bound to the rules of social interaction that make up "customer service"—essentially an antiquated servant mentality bound up in postmodern niceism. By contrast I find that working outdoors with a band keeps us all laughing riotously throughout the day, regardless of the intensity of work or environment. Simply the opportunity to run and yell releases so much of the frustration borne of the enforced self-hypnosis of city life.

The urge to rewild and actively resist runs through the deepest parts of our spirits that have not, cannot be fully domesticated. Any and all steps we take build the momentum that will eventually bring this death-machine to a grinding halt. Teaching urban youth how to gather wild food plants and how to build fires (from campfires to more strategic fires) allows them to begin the journey that one day will set them and all of us free. The wild ones have much to teach us, and we have much to teach each other. The challenge before us all is to spread the seeds of resistance and rewilding to whoever is able to listen, understand and create their own path in the world; meanwhile never ceasing our personal struggles to become more fully human and our collective acts of direct resistance. Our roots are deeper than the machine can ever comprehend.

The journey is never complete. Undoubtedly, there are some very critical plateaus to reach early on, some basic foundations of thought and behaviour upon which so much else is based. From these peaks of experience we come to a place where we begin truly walking wild. The process of breaking through is beautiful, and will involve a lifetime of self critique and growth. Once the questions and critique begin and especially once the first few answers begin to come clear and pathways beat true within the heart, then the journey is begun in earnest and may lead to the hearts of others to help them begin their journey, a sharing that parallels the continued deepening into one's own experience. The wounded healer, the humble but wise coyote teacher, the honest friend is an existence we are all capable of. We are all stronger than the mightiest shaman, for we are all shamans and shapeshifters, feral beings alive in a society that recognizes us but doesn't fully understand us. They remember a flicker of light from an ancient fire, a glimpse of another way of life deep in the past but still within all of our hearts. That reminder intrigues us, pulls us into the realm of possibility where the past stands alongside the future and the present appears as it is, only a mere blip of reality, a choice among many, many others. Knowing that choice sets us free. Knowing that choice lets us see that all around us are the keys to an unknowable number of potential worlds that we will create, consciously or not, by the way we live our lives. Knowing sets us free, but once free we must still climb out of the cage.

The lonely, hermit philosopher sits in a doorless cage, pondering the meaning of his freedom. Rewilding hurts. Honesty hurts. Dealing with hypocrisy within and with others is frustrating and can be maddening to understand, much less deal with in a productive manner. Making choices that are true to one's heart will often bring a whole new form of alienation from the wider society that pangs the heart just as surely as the alienation of not knowing oneself and one's potential can bring. The goal of rewilding is not to bring us to a cozy world of comfort, an idyllic life in a happy community somewhere in a pristine forest. Like I said, honesty hurts. Rewilding brings us instead into an unstable world of uncertainty and constant change. That adversity makes us stronger than we ever

thought we could be. Giving in to the impulses of real needs strengthens personal confidence and the focus that allows dreams to become reality. GO ANYWHERE. But don't *just* go anywhere. Go exactly where you want to be.

Run through a dark forest on a moonless night, leap into a raging river and flow with a current stronger than you are, dance with rattlesnakes in desert canyons, howl with rage at a smoky city from high atop a lonely mountain. *Live free that you may die whole.*

Previously published: Scavenger (from *Uncivilized: The Best of Green Anarchy* 2012).

7 An Ecology of Healing: Sobriety, Addiction, Sanctity, and Resistance

Things Transformed: Inalienability, Indigenous Storytelling and the Quest to Recover from Addiction

by Margaret Smith

Abstract

The impact that the systemic invisibility of indigenous people in the national narrative has on addiction and the recovery process cannot be overstated. An exploration of the nature of how this invisibility has evolved and is currently maintained may facilitate a deeper understanding of the issues. Understanding the importance of indigenous storytelling and identity can help us more effectively meet those working toward recovery. Anchoring such work, inalienability of indigenous identity and the wisdom of indigenous storytelling will be examined as it relates to a recovery process.

Invisibility

The focus of this article will be my indigenous perspective on the relationship between addiction and invisibility of indigenous people and the nature of how this relationship has evolved and is currently maintained. I consider it foundational for comprehending the ongoing systemic influences of colonialism in our perspectives and treatment. I will also be addressing the importance of narrative and identity in the recovery processes.

Our respective worldviews create conditions of comprehension that are unique and contextual. For example, when indigenous people are speaking of individual healing, we are also thinking of community healing and context. While we are considering the mental and emotional aspects, there are other aspects of physical and spiritual that are present in our thoughts (Anishinaabe Elders, personal communications, 1996–1998; Schroeter et al., 2017).

For some indigenous people, illness of any kind (whether it be spiritual, emotional, mental or physical in nature) may be seen as an out-of-balance situation or occurrence (Traditional Elders, AniYunwiya & Anishinaabe, Personal communications 1996–2017; Yurkovich & Lattergrass, 2008). There are many ways in which an indigenous individual today might find themselves in an out-of-balance situation, addiction being one of them. Addiction may be seen at the community and cultural level as a destroyer of life. The

question of how this came to be and what makes it unique to indigenous people specifically lies in the narrative and context of experience and identity.

While the individual narratives may be different and unique, the collective cultural story is more pervasively consistent. As I have grappled with this question from my indigenous perspective, I will share the thoughts that have arisen in the hopes of fostering a growing dialogue with others. I believe that the answer begins with the denial of our inalienability that ultimately led to our national invisibility. It was a tool of the initial colonizers, continues to be used as a weapon against indigenous people, and is one that we sometimes use against each other. I will attempt to articulate the reasons why I believe this is foundational in creating the conditions that lead to addictions and impede our ability to respond effectively to them. I will also be sharing a story to weave elements of the ideas presented, in order to create a context for readers in the journey we can take together beyond this article.

Some years ago, I was in a fiction-writing group and was given the prompt to write a short story that no one would ever read. As far as creative writing goes, this was a very freeing experience, because it allowed me to write without self-censoring or attention to the audience, and it released the inhibitions I would have otherwise had. As I am writing this, my thoughts return to this prompt, because it is central to what I believe is important to convey when discussing matters of indigenous perspectives on addiction and/or mental health issues. We as Native American people exist largely having the truth of our stories unknown to the larger society around us. The primary difference between the fiction writing prompt and the indigenous reality is that the former is a creative choice and tool meant to lead to a breakthrough, whereas in the case of the latter, no choice in the matter is involved at all. If our invisibility in mainstream society is a tool at all, it is one that was forged in colonization and is used to further disempower us and lead to a breakdown.

The narrative of the United States and our place in society has largely rendered us invisible to the mainstream. Even in attempting to support recovery, the narrative harkens to language choices that may inadvertently cast the individual in a negative light. “Disease model” or “addict” – such language is powerful, and we have a responsibility to our relations to shift this. These concepts may attempt to understand a phenomenon, but people are not a phenomenon and we run the risk of making people into predictable caricatures in an effort to neatly fit them into a model. Phenomena are, by definition, those things we observe to exist or are noticed (Phenomena, n.d.). The challenge here in our own post-colonialization existence is that we are likely to observe and notice things in familiar terms that fit our own accepted narrative.

One of the challenges that exist for many indigenous people is that the narrative has been cultivated and maintained in mainstream education that our history began at the point of colonization and virtually no other relevant information is provided regarding our identity as people. The rationale for this is often given that we did not have a written history. However, there have been ongoing efforts from the point of contact to eradicate what history and identity that we had.

While many examples of this exist, one of the more striking early examples was in the 16th century Florentine Codex, where Bernardino de Sahagún spent some 40 years working on a document in the Nahuatl and Spanish languages. He worked with the indigenous central Mexican people to collect their stories and Nahua traditions explicitly for the purpose of understanding their worldview to more readily convert them to Catholicism and stop their indigenous practices (Bernardino, 1970). His superiors then

ordered the confiscation the manuscript to ensure that no one would have access to the indigenous worldviews and traditions of the Nahua people in any form (Peterson & Trerraciano, 2019).

This war on cultural identity and rights has continued in different iterations since then. The history books commonly used in schools begin our story with colonization and often the educational system fails to mention that we exist today. The United States government in treaties with tribes required that the tribes have a way in which to determine their citizenship that the government itself would accept as a legitimate way, as opposed to the historic ways in which tribes identified membership previously. In some cases, this resulted in the identification of ancestors on census rolls and extensive documentation of proof linked to their descendants (Haozous, Strickland, Palacios, & Arambula Solomon, 2014; Schmidt, 2011).

In many instances, blood quantum was established as a means to determine when an individual was no longer considered a member of a tribe, resulting in individuals who are tribally enrolled members now finding themselves parents of children who are not. To ensure that eligible children of parents from different tribes receive the most optimal benefit, parents sometimes need to make a decision of what tribe their child will be enrolled in because they cannot be enrolled in both, regardless of how the child will be raised. Added to this is the issue of disenrollment, a process by which several tribes have begun to change the enrollment criteria and families now find themselves disenrolled (Minke, 2016; Russell, 2017). There are also many indigenous people whose tribes have not received Federal recognition, or whose ancestors were not a part of the original census rolls. At times, this can result in circumstances in which we are not only invisible to the larger society but effectively invisible to one another.

In the absence of school-sanctioned textbooks articulating our truth or existence, with identities divided by enrollment (or lack thereof) and lands and contexts eradicated or disrupted, mainstream society has filled the void of our seeming-absence from their experience in the United States by re-imagining us and creating caricatures of indigenous people. Some examples of this would be mascots of prominent sports teams, stereotypical imagery in advertising and movies, culturally misappropriated objects used in the fashion industry and Halloween costumes purporting to be us (Krueger, 2019; Leavitt, Covarrubias, Perez, & Fryberg, 2015). These dehumanizing images exist for indigenous people, parallel to a narrative in which our stories are largely absent and at times right beside monuments surrounding us that extol mainstream cultural attributes and heroes that we recognize are not our own and are not a part of what we would consider positive.

Due to our omission from the National colonial narrative, except as novelties or curiosities at times, most often we are misidentified as being in another racial or cultural group, as most of us do not fit the constructed and stereotypic images. When we are identified or self-identify as being indigenous to these lands, we are often placed in the role of being perpetual educators of non-Native people. This frequently results in the necessity to correct false ideas of who we are, as opposed to engaging in genuine dialogue. This returns us once again to a status of not being fully seen as people, but as ready-made cultural ambassadors who exist primarily to attempt to educate non-Native people or be a historical place-marker or someone upon which to test out theories regarding stereotypes about us.

While many dominant society members often genuinely want to understand us, frequently what we say or share is questioned or challenged, owing to the fact that it is

diametrically opposed to the colonized teachings they have come to accept as the truth. In fact, they do not understand that they too are victims of a colonizing system that requires their complicity in order to continue. In this system, the societal value of indigenous people is effectively relegated to being relics of the past and demands that the narrative of the relics is clean, sanitized and fits the familiar stereotypes. It does not want us to be the mirror that we raise up to them. In fact, when we do raise it up, they blame indigenous people for the problems that we have, or worst still, pity us for the problems which they themselves are complicit with on a daily basis from the omissions of the very educational system and policies they knowingly and unknowingly support.

To make such statements as an indigenous person is to be labeled hostile, militant, angry or an anarchist, none of which are actually true, and all of which are narrative throwbacks to familiar rhetoric whereby we were characterized as hostiles and savages. While many of us are taught by our elders to be in the here-and-now as a value, in our dialogue with others, we are placed into a position of providing a brief summary of 500 plus years of colonization before we can even reach the here-and-now to have a discussion about the issues we would like to discuss today. The amount of energy and time it takes to engage in this is draining and takes time away from pertinent conversations regarding issues of indigeneity and the future.

There is a growing awareness of the isolation inherent in addiction (Lamis, Ballard, & Patel, 2014; Rapier, McKernan, & Stauffer, 2019; Segrin, McNelis, & Pavlich, 2018). As those who serve this population, we understand how such isolation is detrimental to the health and wellbeing of the individual. Often as the addiction progresses, the individual becomes invisible, obscured behind the symptomatology of the addiction itself. Over time, the individual begins to lose the dignity and humanity of being seen as having positive attributes at all, becoming effectively invisible to those around them. What may be less well understood is the relationship between isolation and invisibility of indigenous people through systemic oppression and how this forms a fertile foundation for the development and maintenance of addictions.

As the addiction moves the individual away from opportunities, resources, friends, family, and community, there is a further split as they become increasingly separated from the person they thought they were and had been, now with the twin companions of shame and self-recrimination to accompany them in their solitude. In my experience as a therapist, community and family member, I have witnessed this and watched the pain experienced often reinforce the addiction. The true identity of the person before me is fragmented, disrupted and clouded.

Might addiction be seen as internalized colonization? We all know the terminology of internalized messages. Is it possible that indigenous people have internalized the messages of this settler society, its historic tenets and present-day aims (Duran & Duran, 1995)? Certainly, alcohol was initially introduced to Native American people early on as a tool of trade and subversion (Ishii, 2008). In terms of its modern-day branding, the marketing around alcohol provides a ready-made, culturally-sanctioned identity. As it is advertised, the premise is that to use alcohol is to be an acceptable part of something, which will purport to lend itself to the person being more appealing, powerful and popular. The presumption is that you must not have this and need this product to gain it in order to be seen as more refined, popular and connected.

Similarly, when people are not seen as they fully are, by virtue of their indigenous lineage, they face the reality of simply reacting to how they are perceived by others.

When one's existence is linked to a pseudo or prescribed identity by the assumptions of the dominant society, individuals are faced with the choice of either denying the reality of their lineage and cultural identity or continually reacting to the discrepancy between who they are versus how they are perceived. Put another way, indigenous people are camouflaged by the assumptions of mainstream society.

From a more holistic indigenous lens, we can look to the spiritual, emotional, mental and physical elements of the impact of colonization. Spiritually, the removal from our home-lands, theft of our sacred objects, desecration of sacred sites and burial places, and denial of our rights to practice our precontact indigenous spiritual ways historically has had a ripple effect across time to present-day. Emotionally, the impact of multigenerational transmission of trauma (Duran & Duran, 1995) cannot be overstated. Involved in this has been the removal of children from families (Goldsmith, 2002), loss of resources and the very things necessary for life, being relegated to the sidelines and cultural erasure. Mentally, having our identity co-opted and replaced by the false mainstream assumptions also has its impact. Additionally, having our traditional leadership structures transmuted, our identities reconfigured and our values recharacterized by the demands of dominant society have a lasting impact on the psychological well-being of indigenous people. Physically, the trauma of the loss of homelands connected to our origins, history, traditional medicines and those spaces that anchor us to our traditional teaching stories are equally problematic. Added to this are ongoing issues regarding disproportionately higher rates of incarceration, food deserts, poverty and economic disparities relative to the larger society.

In writing this, I found myself being pulled into the role of attempting to educate on the extensive historical and present-day impact of colonialism. In an effort to intentionally shift this dynamic, I would invite readers to engage in a process of seeking out this information for themselves. Readers might begin by asking themselves what is the history of the land upon which they live. What were the names of the tribes and nations in these homelands? Where were their burial grounds? I would recommend moving beyond the accepted settler history narrative often found on historical society websites.

It may also be helpful to ask yourself, do you know where Native Americans are in your area today? There is a commonly held erroneous assumption that we only are primarily on reservations and not in urban settings. It is also helpful to orient yourself to the history of your workplace or school as it relates to Native Americans. Such an effort to learn these things may prove quite fruitful. Recently, a trend has emerged where these elements are being vocally acknowledged by non-Native American people in academic and public settings. While an admirable first step toward indigenous allyship (Mitchell, Thomas, & Smith, 2018), it is equally important to intentionally include us in the institutional leadership of such settings.

As it relates to cultivating your own evolving understanding of indigenous people, I would encourage a search of terms, those provided here not being an exhaustive list. Some terms to consider learning more about are; blood quantum, tribal sovereignty, treaty rights, missing and murdered indigenous women, indigenous food sovereignty, Relocation act, Freedom of Religion Act of 1978, Indian Child Welfare Act, Indian Boarding schools, disenrollment, indigenous water and environmental issues, economic and educational disparities, cultural and linguistic revitalization programs, and settler colonialism. It is recommended that you seek out indigenous sources of this information,

with the understanding that there may be a multitude of perspectives as numerous as there are diverse indigenous groups themselves.

Inalienability

The loss of original homelands has created conditions whereby many indigenous people do not have ready access to the traditional medicines and sacred spaces we would have originally gone to in order to heal. Our relationship to the land and places is important to begin to understand this (Smithers, 2019). Our specific homelands provided indigenous remedies and medicines that can be utilized for our respective healing under the guidance of indigenous elders who have the traditional knowledge on how to use them.

Anthropologists have studied the inherent sacred relationship ascribed to certain lands and objects (Ferry, 2002; Kovacevich, 2013; Novotny, 2013). They have articulated this in a concept of inalienability, by which places and objects are imbued with power and cultural significance that can transcend time. They have also noted that removal of the object from the community or communal, original spaces does not diminish its sacred nature or power (Kovacevich & Callaghan, 2013). It posits that inalienability is related to land or possessions, both of which fall into the category of ownership or transferability in the archeological model.

It is of interest that the concept of inalienability has been used as it relates to what western thinkers would identify as non-sentient objects. In many indigenous cultures, origin stories and some beliefs hold that these are living, sometimes sentient relations that have a spirit, purpose, and identity. It is also notable that the same concept of inalienability is not necessarily applied to indigenous people themselves. If inalienability relates to sacred power, identity, and significance, imagine what would happen for indigenous people if we viewed ourselves (and were viewed by others) as having inalienability? How might recovery from addictions be different? Would we then reach a space of seeing ourselves carry forward the inalienable power of our indigenous identities and our value as sacred beings as undeniable (despite removal from original homelands) and inherent in us regardless of where we find ourselves? Might our communities begin to view those members newly in recovery and returning to us as a sacred gift restored to us in their return, one whose experience of separation from us due to addiction has not diminished their sacred nature or power?

What might it mean for recovery from addiction for the individual and community if we could recognize each other's inalienability and identity, regardless of tribal enrollment or phenotype? What might occur if we no longer subjected ourselves to the same divisions we were subjected to by the colonizers? What could happen if we stepped beyond the contrived borders of separation to embrace ourselves and each other as having the inalienable right to be who we are?

As it relates to identity, I see who we are as indigenous people as having inalienability. The challenge becomes one of facilitating connections more fully to our identity and power. There are many wonderful paths up that mountain for us, through language revitalization, traditional ceremonies and ways, and indigenous activism, to name a few. However, there can be a number of unique challenges for the individual to fully access these at times. I would like to suggest one beginning point is a return to our respective indigenous original stories.

Each indigenous group has their own respective precontact stories that were meant to be community teaching stories. Originally, these were oral traditions where people would come together to hear the stories told. Where available in print these days, they are often relegated to the moniker of being “children’s stories,” and are sometimes found in the children’s sections of bookstores. Despite this misnomer, they have a great deal of wisdom in them that is applicable for adults.

One of the most powerful Cherokee stories I have connected with is “Untsaiyi (Brass) – The Gambler,” a precontact story recorded by James Mooney (Mooney, 1902). The Cherokee man, Ayunini, who was also known as Swimmer, is the likely person who shared this community story with Mooney. I would invite anyone to read it for the full story, but I am only sharing a summary here. It is one that I feel resonates with some of the themes discussed in this article but is meant only as a springboard for connection with other stories and other interpretations. It is also meant to connect us to a pre-colonization story in order to tap into the wisdom that existed for thousands of years before the point and time when most mainstream history books begin our stories.

The story begins with an unnamed boy. I do not know if Mooney was told the name of the boy originally, or if this was another rendition of the invisibility previously discussed. We are told that he is the son of a Cherokee mother in the east and that his father is Thunder in the west. It is of interest to me that we are not told his clan, which would have come through his matrilineal side, as that would provide for me a context for understanding the boy in relation to community. It is not possible for me to know the reason for the omission. However, as I am seeing this as a teaching story that relates to concepts of invisibility, inalienability, identity and a quest to healing, the boy’s relative anonymity at the beginning of the story has its merits. He could be anyone, or any one of us, which makes him initially somewhat relatable.

The boy, we are told, is covered with scrofula sores and his mother tells him that his father is a powerful healer and can help him to heal from this. He needs to go out west to find his father. There are many attributions to cardinal direction and meaning that are unique to different tribes and teachings. When I read this, I ask myself what do I know about our meanings ascribed to this direction? What would it mean for me if I set out on a journey alone to the West, given this?

Along the way, the boy encounters The Gambler, also known as Untsaiyi or “Brass,” who also invented the Gatayusti game we once played and gambled on. Brass invented the game and he usually wins, or so we are told. In many respects, Brass reminds me of colonialism, in that the same one who created the game often wins at playing it. He feels like a threat or distraction to attempt to deviate the boy from his quest.

In fact, Brass loves to gamble and tries to lure the boy into the game. The boy declines, saying he is looking for his father and has nothing to gamble with. Brass tells him he will play him for his scrofula sores. I wonder, is he baiting him by making fun of him or offering him an easy way to be rid of what troubles him? How often do we get derailed on our own quests in similar ways today? How often in addictions treatment are individuals only seen by through the lens of what they came to in to heal from, as opposed to being all that they are? In any case, the boy ignores this and continues to his father’s home.

In some versions of the story, the boy indicates that he will see Brass again on his return or will be back. It is unclear why the boy says this to him, but in the saying of it, he is obliging himself to follow through and do it. I understand this as being more than

simply a storyline mechanism meant to let the reader know there will be more, but I see it as potentially related to a teaching related to keeping one's word.

The boy finds his father, Thunder. Once there, he is told to sit in a thorny chair, to verify that he is Thunder's son. I laugh when I read this because it reminds me of the times I have gone for my own healings and felt a level of challenge preceding these. Once again, there is a feeling that this boy is relatable. The boy sits on the chair with no problem and is not injured at all by the thorns. This is where I believe it is important to note, his inalienability as the son of Thunder, his power and relevance are fully intact despite the fact that he has not yet healed from the sores.

Upon having confirmation that this is his son, Thunder agrees to heal him and asks his wife to make the preparations. She boils a pot of water and Thunder puts herbs and medicines in it and puts the boy right in, where the heat might boil another alive. He then directs his wife to pour the whole pot, with the boy inside, into the river. The boy emerges, and the scabs are all gone. I believe it is the boy's inherent, inalienable identity that actually facilitates his healing from the scabs.

After the boy is healed, his father's wife tells him that Thunder has new clothes for him to dress in and will ask the boy to select adornments to wear from a box. She advises him to reach in deep to the very bottom of the box for his. She also advises him that Thunder will send for his other sons (the Thunder Boys) to play ball against him and that they would play a game of Cherokee stickball. She lets the boy know that if he tires, he ought to strike out at a particular tree which is his father's favorite tree, and his father will end the game so as not to lose the tree.

Similar to how the boy is not named in the story, we are not given a name for Thunder's wife. However, she has accepted this boy and participated in his healing treatment. She anticipates what will occur and provides him with advisement that he could not otherwise know himself. She sees something in him that he also does not see in himself, which in my mind makes her special. She reminds me of adopted "Aunties" or trusted mentors I have known. She might be similar to those supporting an individual through the recovery process who know first-hand what lies ahead and holds space for the individual new to their healing journey, all the while having faith that the person will come to it on his or her own.

When Thunder arrives, he opens the box and the boy finds it is filled with living snakes. He reaches in and pulls out a rattlesnake to wear around his neck and copperhead snakes to wear around his wrists and ankles and proceeds to play the game. As the play is described, we come to learn that the boy is Lightning.

I chose to share this part of the story because I believe that what is necessary in order for us to shift addictions is, in part, to "reach in deep" as Lightning did. The story tells us that he was not afraid when he reached into that box of living snakes, yet I imagine this is the first time the boy ever encountered an invitation such as this! Keep in mind, he had only just healed and might not have been aware of what great things he was capable of.

There are times when people early in a recovery process are asked to do things that are new to them, now terrifying in the absence of their drug of choice. Yet in this story, before he even knows what he is expected to wear as adornments, the boy is given the directive to get right in there and do it. Recovery processes themselves are an act of faith for many entering into them. Ultimately, Lightning's inalienable qualities are proven in

the challenges presented. His power and lineage are not diminished because he has not yet fully healed and is only coming to know this aspect of himself.

Early in the story, you will recall that the boy had told Brass he would return. Lightning tells his father of his encounter with Brass after the stickball game and Thunder devises a plan. He informs his son of particular actions to take and outlines a sequence of events that he expects will occur in gambling with Brass. Thunder lets Lightning know that there is a specific time and moment when he should call on his brothers to join him so that Brass does not get away.

As I had mentioned earlier, I see Brass as being a bit like colonialism, in that he is tricky, and will invariably win the games he sets into play because he created them. In this instance, I see the story as providing some present-day guidance in this regard. Taking what we know about colonialism, are we able to outline the sequence of events that are likely to occur when dealing with its representatives and systems? Do we understand that expecting the individual (or community, for that matter) to go it alone into facing these systems will likely result in their losses? Are we all willing to step into the roles of brothers (or sisters) and take the actions necessary when the game plays out as anticipated?

Words are powerful. Words are what we use as therapists, as clients, to articulate an experience and to be understood and to understand. However, treaties, laws, and treatment all consist of words and we need to consider how these words further malign or render invisible indigenous people and our worldview. As you will have noted, I mentioned treatment as it relates to words and power.

We aspire to evidence-based treatments and often our funding streams require this, along with targeted goals and measurable outcomes. One challenge to this is that in order to get the money to provide the treatment, indigenous people need to fashion what is said into terminology acceptable to dominant society norms. They may be forced to re-characterize our wisdom and worldviews into terminology and structures acceptable to the existing systems. While this careful curation of words to fit grant aims may be effective for the short-term goal of obtaining the financial resources for treatment, the longer-term outcome of this is to inadvertently legitimize and endorse the very system requiring it of us. The additional risk comes in dominant society agencies then using these to justify future “indigenized” shortened treatments or attempting to generalize a treatment done on one tribe to all indigenous people.

Often in the context of managed care, time-limited treatment, and manualized interventions, there is a drive to truncate what is talked about in sessions in favor of “progress.” There is a drive toward treatment efficacy that moves in a linear fashion through prescribed treatment goals with clients. Treatment is frequently based on key factors, being relevancy, recency and research. Context is key in this regard, in that what is considered relevant, recent or is being researched is largely driven by settler worldview, agenda, and available funding.

The research base for most commonly accepted evidence-based treatments does not often have sufficient indigenous representation in the data to justify its use with the population. Further, while many Native researchers and scholars are diligently working to change this, we also need to see much greater authority at the community level regarding the decisions of legislation and funding of addictions treatment.

Recommendations are made to supplement treatment with a variety of pharmaceutical drugs available to alleviate the individual's symptoms because these are seen as having an emotional or biological basis. While some use of medication can be helpful, there has been insufficient dialogue at the national level on two points. The first is the degree to which research has adequately included Native American people sufficient to warrant a drug's use. The second is, if the use of pharmaceuticals to supplement mental health and substance use treatment may be simply medicating the population to better survive the ongoing effects of colonialism, rather than addressing the problem directly. Will you see these constraints for what they are and step up to assist, as the brothers in the story do, when called upon to do so?

At the end of the story, Thunder, Lightning and the Thunder boys succeed in putting Brass under deep water, spiked in place. We are told Brass cannot die until the end of the world, which means he could come back again, or perhaps he has already.

Things transformed

Many indigenous communities have our respective traditional teachings, wisdom, sacred spaces, medicinal knowledge, and stories. I believe that our precontact indigenous stories are viable teaching tools for each of us today as they were a thousand years ago. In my own life, I have found that by revisiting these in the context of my experience, my understanding grows. One way that I have used these in therapy has been to inquire if the individual has a teaching or a story from their respective tribe or nation that provides them with guidance or context when faced with a challenging situation. I am careful not to ask for details regarding the teaching or story, as that would potentially be culturally voyeuristic. Some tribes have specific protocols about when some stories are allowed to be told or who may be privy to them (Anishinaabe Elders, personal communications, 1996–1998; Younging, 2018). My inquiry is meant only to see if the individual can begin to tap into their own inalienability through the stories and re-ignite a sense of self-efficacy in the process.

I have introduced this in community meetings, with questions regarding what indigenous stories do we respectively have that could give us some insight into areas, such as: Who are our community threats? Who are our helpers? What do our stories teach us about how to resolve conflict? How might we be able to integrate precontact teaching stories into our daily lives? Having worked in an urban Native American community, it is a challenge because there can be multiple stories from different tribes. The goal is really to keep it that way, as opposed to imposing one tribe's stories for the sake of simplicity or ease of accessibility. Each respective tribe and nation that has their stories all have stories of value and that are rich in their truth and wisdom. All deserve a place in the circle.

An equally important element of our stories are that we are here, which is affirming and validating. We can share these and connect with each other and across time and space. Those stories can remain with us and are a part of us. They may help us because they speak to us and through us of our potential to activate our own sense of personal autonomy, authority, and power in the context of our own lives. How might we transform our world through the lens of our stories, if we remove the lens through which we view ourselves in the larger personal and social narrative? When we begin the shift of intentionally dismantling the embedded colonial narrative around ourselves and entertaining the idea that such narratives have not and never will serve us, what might

happen? Do we enter the liminal state between who we once existed as and who we are meant to become?

Our present-day indigenous storytellers, authors, filmmakers, singers, writers, and poets are articulating concepts relatable and real to our indigenous people. They are putting into words our experiences and accurately conceptualizing a phenomenon. They are very special to us because they collectively ensure our reality and personhood will be invisible and silent no longer. They are engaging in “things transformed.” They are writing, speaking, singing and manifesting their truths, as well as our own and healing us in the process. “Things transformed” (Fogelson, 1962; Freeman-Witthof, 1988) is a term I came across, a rough translation by some of what our process was in our sacred games and the preparations preceding them. Things transformed, in my mind, occurred when Lightning reached into that box of living snakes and pulled them out to wear them as adornments in order to go on to play the game.

What would happen if we did the same? What would happen if we faced those things we thought could destroy us and instead wore them boldly and allowed them to strengthen us? If we moved beyond the invisibility to embrace our own inalienability? It is notable that in the story, Lightning’s healing is his own (i.e. it becomes a part of him) but those fearsome snakes that could strike him down do not become a part of him, but are separate and living entities that he wears. I personally interpret this as a beautiful part of the wisdom of this story. I think this is important in the recovery process. We do not want to reach a point of allowing those things feared to become a part of us, only see our healing as an adornment (in effect, for show) and being separate from ourselves (not believing we fully are deserving of healing).

Not all of us still have the stories in their whole or complete form, nor do all of us know our teaching stories. In returning to them and considering them, their parts can potentially restore us to balance in restoring our knowledge and inalienability of identity. Have you returned to your precontact, pre-colonization stories? Do you look to them to gain insight into your problems today? What would it mean if you did? What might it teach you about living a life or addressing these challenges that might otherwise seemingly destroy you? You did not, your people did not, emerge out of the ethers as “American, in the Great Melting Pot,” because there was a time that this did not exist. Whose narrative do you choose as your own and why? We are very conditioned to accept a familiar narrative.

I have shared about our precontact indigenous stories and our present-day indigenous storytellers. I also believe that there is storytelling that becomes a part of the national and collective narrative. While there may be other examples, I will share the one that I am most familiar with and how I view these actual events as the creation of living stories that raise our voices in the national narrative.

I was blessed to have met elders such as Josephine Mandamin (Anishinabek Nation), who began the Water Walkers (McGregor, 2013) and LaDonna Brave Bull Allard (Standing Rock Sioux Tribe), who supported the Water Protectors (Privott, 2019). These elders provided national momentum for the gatherings of indigenous people and our allies. These strong Native women were more than simply indigenous environmental activists calling us to protect the waters. They pulled us out of the slumber of colonialism and invisibility and brought us into the light. They were engaged in acts of cultural persistence that began long before them and will continue long after them.

There is something special here, this act of being seen and cared for as a whole and not parts. So, movements like the Water Walkers or Water Protectors are very powerful for us, in that they shift the national narrative and create new, living stories. We have the potential to become a part of the story. It is not singularly because we protect the waters and are committed to such causes. The real power of it is that these helped to transform us from being invisible in the national rhetoric to a place of visibility and into the light and gave us hope. Further, they exemplified our inalienability through their actions. These elders taught us through example that we are powerful, capable people who come from powerful, capable people. It has been within us all along.

I listen to stories and write them as well, and everyone has their stories. We have our personal stories, family stories, community, and societal stories. Every one of these is important and needs to be heard and understood. Most therapists reading this will understand this. There may be a desire to integrate this into treatment. I would say that more harm can be done mandating reading of Native stories and imposing false identities on indigenous people seeking recovery.

There also may be a well-meaning temptation for therapists to co-opt native stories and bring them into their work with indigenous clients. That may be cultural misappropriation or cultural voyeurism, depending upon the context (Younging, 2018). Rather, go to your own pre-colonization stories. Deconstruct the accepted colonial narratives that you yourself may have been subject to and begin anew. Walk that process through in order to understand it on a personal, visceral level. Ask yourself, what are our origin stories? What healed us? What were our community threats? Who are our helpers? What are our values? What is the story within the story? How can I apply this to my everyday life?

Remember that you, too, come with a story. One of the great strengths of Alcoholics Anonymous and other 12 step recovery programs is that these recognize the importance of being able to share one's story with others in a supportive environment of people who understand from lived experience. This can be important for indigenous people in recovery, given that there are few places within our current systemic structures that afford them such space. The value placed on a sense of community where people come together as equals in a circle also is familiar and resonates with many indigenous people.

One of the first things I learned working in an urban Native American community was that people will want to know who you are, where are you from, and why are you here (Urban Indigenous Elders, Senior Elder Luncheons, Personal communication, 1999). These are a natural starting point and are not derailment or distractions most times. It is not sufficient to provide a surface or glib answer to these often-unspoken questions, but to give a thoughtful reflection and authentic response. You both come with a story and become a part of a story.

The story of those indigenous people you serve did not begin with you. There may be a community experience of people in your role who often leave prematurely, and you may be seen through the lens of that reality. The individual before you may have had first-hand experiences of people who look like you; certainly, their tribe or nation has had collective experiences in a historical context of people you may represent to them. If you do work as a therapist, we are customarily trained to maintain boundaries and refrain from dual relationships. However, if you are working in the context of indigenous

communities, this may be contraindicated in terms of gaining community trust and engagement.

Mental health and substance abuse stigma exist within indigenous communities, as is the case with other communities. It infiltrates and toxifies communities and it further separates the individual struggling with addiction from the very thing needed. I believe that what is needed is for communities to see themselves as a part of a collective recovery and process.

In my own experience, destigmatizing mental health and substance use treatment at the community level also meant normalizing having a therapist in the community at multiple levels. Simply put, people needed to see me volunteering and joining appropriate social activities to get to know me as a person. Work with the community and approach such work with cultural humility and an open heart and mind to learn.

I would recommend if you do this to get consultations from someone who has done it before, to ensure that you are doing it in a balanced and culturally appropriate way. I would also suggest frank discussions with clients in advance regarding other roles you develop and maintain in the community so that they are not taken by surprise. It is also a good opportunity to discuss together how you will navigate that if you find yourself in other spaces together.

Not all indigenous people are connected with their respective community or collective community resources. Depending upon the setting, some may have had virtually no connection at all. It is difficult as an indigenous person to say you do not know your language or your traditions, if that is the case. It is particularly challenging to try to fathom a new relationship with community when entering into recovery. Engaging available community resources can be hard, owing to multiple community relationships. The individual may not want to access particular spaces because of community gossip or stigma. It is advisable to tread gently in these areas, as they cannot be forced.

As this article comes to a close, I am filled with a fear of what is left unsaid. Perhaps I forgot something critical to mention? Then, I remember. I am back someplace else, another time and place when I first encountered our stories. While it was new for me at that time, this was not a beginning, but a continuance of cultural persistence across generations. I recall not wanting the story or moment to end. What if I had not learned enough? Worse still, what if I forgot?

The funny thing is that while that moment and that story both ended, they were not really finished with me. It did not matter that I had not memorized every detail of the story. After first reading *The Gambler*, I could never really see *Lightning* or *Thunder* again in the same way. It connected me in a way it never had before. They became for me so much more than they had been before and gave me pause and wonder anew. Each time I saw them, I was once again in the story and in those moments, the stories came to life for me again.

These stories connect me to our precontact worldview and my place in it, my family's place in it and those of all my relations, across time. They remove the false separation between me and the world, and in doing so, helped me to acknowledge all of our relations. The stories removed my own colonized blinders and helped me to see their inalienability. Such moments of awareness bind and connect. When shared with others, they form new stories and from those, new memories that strengthen our connection to each other, to the world and our own inalienable identity within it.

With that being said, I have to believe that the same will happen for you. You are finished with this article, with this special issue related to indigenous worldviews, but is it finished with you?

References

- Bernardino, de Sahagún, 1499-1590. (1970). *Florentine codex: General history of the things of New Spain*. Santa Fe, NM; Salt Lake City, UT: The School of American Research; University of Utah.
- Duran, E., & Duran, B. (1995). *Native American postcolonial psychology* (Suny series in transpersonal and humanistic psychology). Albany: State University of New York Press.
- Ferry, E. E. (2002). "Inalienable commodities: The production and circulation of silver and patrimony in a Mexican mining cooperative." *Cultural Anthropology*, 17(3), 331–358. doi:10.1525/can.2002.17.3.331
- Fogelson, R. (1962). *The Cherokee ball game: A study in Southeastern ethnology* Philadelphia: [Doctoral dissertation, University of Pennsylvania]. ProQuest Dissertations & Theses Global.
- Freeman-Witthof, B. (1988). "Formal games in the Cherokee ritual cycle." *Expedition*, 30(2), 53–60.
- Goldsmith, D. (2002). "In the best interests of an Indian child: The Indian Child Welfare Act." *Juvenile & Family Court Journal*, 53(4), 9–17. doi:10.1111/j.1755-6988.2002.tb00070.x
- Haozous, E., Strickland, C., Palacios, J., & Arambula Solomon, T. (2014). "Blood politics, ethnic identity, and racial misclassification among American Indians and Alaska natives." *Journal of Environmental and Public Health*, 2014, 321604. doi:10.1155/2014/321604
- Ishii, I. (2008). *Bad fruits of the civilized tree: Alcohol & the sovereignty of the Cherokee nation (Indians of the southeast)*. Lincoln: University of Nebraska Press.
- Kovacevich, B. (2013). "The inalienability of jades in Mesoamerica." *Archeological Papers of the American Anthropological Association*, 23(1), 95–111. doi:10.1111/apaa.12018
- Kovacevich, B., & Callaghan, M. (2013). "Introduction: Inalienability, value, and the construction of social difference." *Archeological Papers of the American Anthropological Association*, 23(1), 1–13. doi:10.1111/apaa.12012
- Krueger, J. (2019). "To challenge the settler colonial narrative of Native Americans in Social Studies Curriculum: A new way forward for teachers." *History Teacher*, 52(2), 291–318.
- Lamis, D. A., Ballard, E. D., & Patel, A. B. (2014). "Loneliness and suicidal ideation in drug using college students." *Suicide and Life-Threatening Behavior*, 44(6), 629. doi:10.1111/sltb.12095
- Leavitt, P., Covarrubias, R., Perez, Y., & Fryberg, S. (2015). "'Frozen in time': The impact of Native American media representations on identity and self-understanding." *Journal of Social Issues*, 71(1), 1. doi:10.1111/josi.12095
- McGregor, D. (2013). "Indigenous women, water justice and zaagidowin (love)." *Canadian Woman Studies*, 30(2), 71–78.
- Minke, T. (2016). "Christman v. Confederated Tribes of Grand Ronde: A chapter in the disenrollment epidemic." *American Indian Law Review*, 41(1), 201–217.

- Mitchell, T., Thomas, D., & Smith, J. (2018). "Unsettling the settlers: Principles of a decolonial approach to creating safe(r) spaces in post-secondary education." *American Journal of Community Psychology*, 62(3–4), 350–363. doi:10.1002/ajcp.12287
- Mooney, J. (1902). *Myths of the Cherokee: Extract from the Nineteenth Annual Report of the Bureau of American Ethnology*. Washington, DC: Government Printing Office
- Novotny, A. C. (2013). "The bones of the ancestors as inalienable possessions: A bioarcheological perspective." *Archeological Papers of the American Anthropological Association*, 23(1), 54–65. doi:10.1111/apaa.12015
- Peterson, J. F., & Terraciano, K. (2019). *The florentine codex: An encyclopedia of the Nahua World in sixteenth-century Mexico*. Austin: University of Texas Press.
- Phenomena. (n.d.). Merriam-Webster's online dictionary (11th ed.) Retrieved from <https://www.merriam-webster.com/dictionary/phenomenon>
- Privott, M. (2019). "An ethos of responsibility and indigenous women water protectors in the #NoDAPL movement." *American Indian Quarterly*, 43(1), 74–100. doi:10.5250/amerindiquar.43.1.0074
- Rapier, R., McKernan, S., & Stauffer, C. (2019). "An inverse relationship between perceived social support and substance use frequency in socially stigmatized populations." *Addictive Behavior Reports*, 10, 10, 100188. doi:10.1016/j.abrep.2019.100188
- Russell, N. (2017). "'To further justice in the greater Native American community': Ethical responsibilities of a tribal attorney in disenrollment disputes." *The Georgetown Journal of Legal Ethics*, 30(4), 991.
- Schmidt, R. W. (2011). "American Indian identity and blood quantum in the 21st century: A critical review." *Journal of Anthropology*, 2011(549521), 1–9. doi:10.1155/2011/549521
- Schroeter, A., Brunton, N., Kakekagumick, K., Cromarty, H., Linkewich, B. H., O'Driscoll, T., & Kelly, L. (2017). "Using the First Nations medicine wheel as an aid to ethical decision-making in healthcare." *The Canadian Journal of Native Studies*, 37(2), 179–191.
- Segrin, C., McNelis, M., & Pavlich, C. A. (2018). "Indirect effects of loneliness on Substance use through stress." *Health Communication*, 33(5), 513–518. doi:10.1080/10410236.2016.1278507
- Smithers, G. D. (2019). "Native ecologies: Environmental lessons from Indigenous histories." *History Teacher*, 52(2), 265–290.
- Younging, G. (2018). *Elements of indigenous style: A guide for writing by and about indigenous peoples (Indigenous collection)*. Edmonton, Alberta: Brush Education.
- Yurkovich, E. E., & Lattergrass, I. (2008). "Defining health and unhealthiness: Perceptions held by Native American Indians with persistent mental illness." *Mental Health, Religion & Culture*, 11(5), 437–459. doi:10.1080/13674670701473751

Originally published as: Smith, Margaret. "Things Transformed: Inalienability, Indigenous Storytelling and the Quest to Recover from Addiction." *Alcoholism Treatment Quarterly* 39, no. 2 (2021): 160–174.

The Story of Alkali Lake Community (Esketemc First Nation)

by Phil Lane, Jr., Michael Bopp, Judie Bopp, and Julian Norris

Introduction

In this case study, you will read what has become, in “Indian country,” the nearly legendary story of Alkali Lake, a Shuswap Indian Reserve of some four hundred people near Williams Lake in north-central British Columbia. You will read of how the Alkali Lake people brought about a dramatic transformation from the depths of severe alcoholism and social devastation, to become an inspiration, a role model, a helper and a teacher to hundreds of other communities.

At the outset we must alert you to a number of inter-related factors that make the telling of this story problematic.

1. The story of what happened (and is still happening) within Alkali Lake is not our story to tell. The right to tell that story belongs solely to the Alkali Lake people. Indeed, there is no one story. There are, rather, hundreds of stories that are blended together to make up what we will generally refer to as the “community's story.” We have reluctantly agreed to share what we know of that story because we believe it has much to teach all of us about the nature and critical processes of community healing and development.

2. The community's story was first told to the world by Alkali people in a film entitled “The Honour of All: The Story of Alkali Lake,” released in 1986. While the film was in every way faithful to the story as the people had experienced it up to that time (1985/86), the real Alkali Lake quickly transformed into something of a myth in “Indian country,” metaphorically representing the possibility that healing could come to all communities suffering from similar conditions. Indeed, it is fair to say that the makers of the film intended and anticipated such an outcome as an antidote to the despair that was prevalent in so many Canadian and American tribal communities at that time.

3. The story of Alkali Lake is not a fairy tale in which everybody lived happily ever after. There was indeed a dramatic turnabout in alcohol consumption. But ten years after the movie was made, Alkali Lake people are still struggling with underlying issues. While the use of alcohol was overcome in one generation of people, many of their children are now engaged in struggles of their own. The healing process is far from over.

4. Alkali Lake did not happen in a vacuum. We now know that there were dozens of other tribal communities which were undergoing similar transformations at around the same time. Without in any way diminishing the achievement of Alkali Lake people, it is

critical to understand the ecology of the Aboriginal healing movement that gave rise to Alkali Lake, as well as to many other dramatic personal and community transformations.

All story telling must be grounded in some intention. Stories are not merely a recitation of past events. In the recent marriage of participatory action research (such as in the work of Fals-Borda (1991) with community development practice, facilitating the telling of the “community's story” has emerged as a methodology for community analysis, visioning, planning, and evaluation (see Bopp and Bopp 1998, and Feather 1996). The community story process is essentially a method for systematizing what a community knows about itself concerning the past, the present and the desired or anticipated future. It is also a powerful builder of consensus and solidarity.

Our purpose in writing about Alkali Lake goes beyond recounting what happened to one community, and even beyond shedding light on the Aboriginal wellness movement (which we certainly will try to do). Our purpose is focused on the problem of what is entailed in helping traumatized communities to transform their health conditions from within.

The Community's Story

As far back as Alkali Lake elders can remember, there was no use of alcohol on the reserve before 1940. Just before World War II, a general store and trading post was set up at Alkali Lake by a European immigrant to the area. The people brought their furs to the store and received cash or merchandise, such as food staples, in exchange.

The elders recount that the trader gradually introduced alcohol to the people as a means of “softening them up” during the process of negotiating the value of their furs. Once alcohol entered the community system, there was a gradual deterioration of the health and well-being of the people. At first only a few families were affected, but other kinds of pressures were also mounting. A whole generation of Alkali Lake young people were sent off to residential schools. While many people credit the schools with providing educational opportunities, two very negative outcomes contributed to the continued slide into community alcoholism.

The first was that a generation of children grew up apart from their parents and family life. They were forced to speak English (or French in some cases) and were punished for speaking their Native language. They were told over and over again that their own cultural foundation (beliefs, values, customs and knowledge) were not only primitive and inferior to European ways, but also (especially in regards to indigenous spirituality) sinful. The flagrant psychological and spiritual colonization of Alkali Lake's children engendered a kind of racial/cultural self-hatred. The mind-set this process engendered led many Alkali people to believe at a deep, subtle and mostly unconscious level that unless they somehow became culturally “white,” they were “no good,” “savages,” “primitive,” “flawed,” “less than,” “unable,” “inferior,” “useless” people who could never really stand as worthy and equal human beings in comparison to their Euro-

Canadian neighbours. This insidious way of thinking was not unique to Alkali Lake. Most indigenous communities in Canada have been heavily impacted by similar processes of internalized oppression.

The second devastating outcome of the residential schools was the introduction of wide spread physical and sexual abuse. No one knows for sure what percentage of Alkali children were abused, but it is known that the numbers were very high. Once abuse was introduced into the lives of Alkali children, it would be generations before it could be completely uprooted. In the mid 1980s, as the issue of sexual abuse was just being surfaced in Alkali Lake, upwards of ninety percent of the entire population of Alkali Lake young people had been sexually abused.

When the residential school generation returned to the community to start their own families, many did so having been raised through a large part of their childhood by large, impersonal and sometimes dysfunctional institutions. Because they had not been parented themselves, and because they had not internalized the traditional family values and processes so vital to healthy family and community life, Alkali Lake people were much more vulnerable to the culture of alcohol. Add to this vulnerability the pattern of physical and sexual abuse and it becomes clear that during the darkest period (1965 to 1985) growing up and living in Alkali Lake was something of a walking nightmare for most people.

A once hard-working people now lived in a village strewn with years of accumulated garbage and broken-down cars. Their once well-tended houses now had holes in the walls, paint peeling off the outside, windows broken and covered with cardboard, furniture broken and dirty, and a general spirit of sadness that filled up all the spaces.

Children often came to school (when they came at all) hungry, bruised and numbed by neglect, psychological humiliation, or the prolonged terror of physical and sexual abuse. It became commonplace for them to see their parents and other adults staggering from house to house in search of a bottle or the next party. Children learned to cower and hide when their parents got into screaming matches, which often ended in physical or sexual abuse, or worse. And with the alcoholism came poverty, hunger, sickness, suicides, and layer after layer of loss as loved ones died in accidents, from violence or from largely unnecessary disease brought about by constant abuse and neglect of the body.

As one prominent community member put, "We had become what others called us: the Indians of Alcohol Lake." Most of the people were so immersed in this reality that they were unable to "see" any other possibility for themselves. As another young man put it, "I thought that was how Indians lived."

Despite their total immersion into the culture of the alcoholism (i.e. the personal and social dynamics of addiction such as denial, self-destructive behaviour, manipulation and mistrust of others, etc.), Alkali Lake people talked a great deal about sobering up. The church set up a pledge system. Chief and Council (all practicing alcoholics) endlessly discussed "the problem," but everyone felt powerless to really do anything about it.

A look at the economic reality of Alkali Lake during those years is also instructive. Virtually everyone (with the exception of a few Band employees) received social assistance cheques every month. A very high proportion of the government money

coming into the community was quickly converted into alcohol. The liquor stores and taxi companies in Williams Lake (thirty-five miles away) made a booming business selling alcohol to the Reserve. Three regular shipments a week came in on the “Dog Creek Stage,” and special orders by taxi could be arranged at anytime.

Bootlegging (the practice of selling alcohol illegally) was widespread. Any child with money could buy a bottle. Bootlegging was a very profitable business for some (including some of the community's political leaders). So, despite the talk of “sobering up” that was common, some people were making a lot of money from the misery of Alkali Lake people.

In June of 1972, a seven year old girl told her mother, “I don’t want to live with you anymore.” The girl was Ivy Chelsea, daughter of Phyllis and Andy Chelsea. Both Andy and Phyllis had been drinking since childhood. The family had recently moved back to the Reserve from a nearby town. Andy and Phyllis often “partied” for the entire weekend. On this occasion they had left little Ivy in the care of Phyllis’s mother. When Phyllis returned (hung over) to retrieve Ivy, the little girl refused to go home with her until both her parents quit drinking. Phyllis promised she would, and she did. She tells of going home and pouring all the booze in the house down the kitchen sink. Four days later, Andy also quit drinking. At that time, Andy and Phyllis were the only two non-drinking people in the entire community.

They tell of the visits of Brother Ed Lynch, an Oblate Brother and A.A. counsellor from nearby Williams Lake. Brother Ed had been trying to convince Alkali Lake people to come to A.A. meetings for several years, but (as Andy put it) “everyone pretty much ignored him.” An entire year passed, and as Brother Ed and Andy and Phyllis Chelsea sat around the birthday cake Brother Ed had brought them to celebrate one year of sobriety, they wondered out loud how long it was going to be before anyone else would join them. They talked about how hard it was to even remain in the community, especially on long weekends. They all agreed that it was “pretty damn lonely,” and that all they could do was take it “one day at a time.”

During the next seven years, a small handful of people stopped drinking and began working with Andy and Phyllis to try to restore at least some level of health to the people of Alkali Lake. One sure sign that, despite their addictions, Alkali Lake people deeply desired to find a way out of the pit they found themselves in, was the fact that Andy Chelsea was elected Chief of the reserve in 1972, shortly after he quit drinking.

Andy was very clear about his intentions of using his political power to help the people of Alkali Lake to return to health. While it is true to say that on one level Andy Chelsea’s interventions were welcome, it is also true that the battle had barely began. The tiny core group of people that had to struggle every single day just to maintain their own sobriety now met denial, resistance, rebellion, resentment, scorn, threats and outright violence in their efforts to persuade their fellow community members to stop drinking and to go to an alcohol treatment program.

The following is a short list of some of the actions taken by the new Chief and his core group.

- The Dog Creek Stage which brought booze to the Reserve three times a week was refused access. No liquor sales were to be permitted on the Reserve.

- The RCMP were called in and marked bills were used to prove that bootlegged liquor sales had occurred. In one instance, the entire company of Alkali Lake bootleggers were arrested and put out of business. Two of these were the mothers of Andy and Phyllis Chelsea.

- A voucher system was set up with stores in Williams Lake. People who were the worst drinkers no longer received their welfare money in the form of cash. Instead, they were given vouchers which they could exchange for food or other necessities.

- People who committed alcohol-related crimes ranging from drunk driving to assault and battery were given the choice: either go to treatment or go to jail.

- The Catholic priest was approached and asked to cooperate with Chief and Council in encouraging the people to stop drinking. Unfortunately, the priest was an alcoholic and was actively promoting opposition to Andy Chelsea's efforts. At one point he made it clear to Andy that "we are going to get you deposed as Chief." The priest was ordered to leave the Reserve. As it turned out, the priest was having an affair with the nurse. The two of them left together.

These sets of actions were met with extreme anger, hostility and resentment by many of the people. As Freddy Johnson (another very prominent community member) recalls, "I told him that now that you've become the teetotaling Chief, you think you can go around bossing everybody else's business. Get the hell out of here!"

Still, the numbers of people who had stopped drinking all together continued to increase. It was very slow at first. By the end of 1973 there were less than a dozen sober people. Then, in 1974, some thirty-five people went to treatment. A turning point had been reached. By the end of 1975, forty percent of the community was clean and sober. The process was by no means easy, but by 1979, ninety-eight percent of Alkali Lake people completely abstained from the use of alcohol.

In order to strengthen and consolidate the healing process, it was necessary to link healing to tangible progress in the social and economic conditions of the people. Some of the strategies used to accomplish this by the Chief, Council, Band programs and a growing core group of volunteers included the following.

- A deliberate effort was made to revive traditional Native forms of spirituality and healing. Because much of the community's own cultural resources had been lost during the dark years, traditional teachers from other communities were asked to come to Alkali Lake in order to help the people rediscover their indigenous identity and spirituality. Through this process, the use of the sacred pipe and sweat lodge was re-introduced, and these cultural resources become very powerful instruments which helped many Alkali Lake people find their way back to sobriety and a path of wellness.

- Whenever anyone went out of the community for treatment, their children were taken care of, their house was cleaned up and repaired, and when they got back, there was a job waiting for them.

- A variety of economic enterprises were initiated to provide employment for the growing numbers of non-drinking people. Some of these included a piggery, a market gardening business, a laundromat, a logging operation, a restaurant, and a mechanical repair shop. By 1985, Alkali Lake had achieved full employment (i.e. everyone who wanted a job had a job).

- While there was work for everyone, the full human potential of Alkali Lake people had not nearly been exhausted. There was a need to move beyond the struggle with alcohol to life after the bottle. This need required that further healing and learning opportunities be provided to the people. To respond to this need, a wide variety of training opportunities were made available to the people covering many topics connected to personal and community wellness and the continued pursuit of social and economic improvements.

Postscript: 1998

Early in 1985, as the research and preparation for the making of the film “The Honour of All” was underway, it was already evident that the transformation which had occurred relative to the use of alcohol (dramatic and significant as it was) was only the beginning of the community’s journey toward wellness.

Following are some of the major issues and challenges that arose as the process continued.

1. Fame and Notoriety

In 1985 the film, “The Honour of All: The Story of Alkali Lake,” was released. The film had an electrifying effect on indigenous communities across the entire continent of North America. That year, Alkali Lake hosted the first of several international conferences focused on the healing of indigenous communities. Several hundred people were expected to attend the first conference. Twelve hundred came. In 1986, a second conference attracted some two thousand five hundred people from across North America and around the world.

One of the reasons Alkali Lake agreed to make the film telling their story (despite misgivings that their story would be appropriated and altered by outsiders for purposes unrelated to Alkali Lake) was because community leaders such as Andy and Phyllis Chelsea and Freddy Johnson were increasingly out of the community doing workshops and presentations about what had happened at Alkali Lake. It was hoped that the film would make it possible for many people to hear the story without putting such a high demand on the primary leadership of the community.

In retrospect, the film had the opposite effect. It soon became clear that exporting training was rapidly developing into a booming business. By far the most sought after presenters were Phyllis, Andy and Freddy. Parts of the community increasingly resented several things about this new development.

1. Most people felt that Alkali Lake's turnaround was a hard-won victory after a long battle. It was not merely a few "celebrities" who had fought that battle. It had taken enormous courage and strength on the part of many people. Almost everyone had suffered losses along the way. Now it appeared that the credit for what had happened at Alkali Lake was being given (by an adoring public) to a few people. This was not a concern arising from simple jealousy (although that too was no doubt a factor). Andy and Phyllis themselves know only too well that while they may have been catalysts, there were many heroes and heroines in the true story of Alkali Lake, and they often said so in their presentations across North America. The deeper issue was the community's need to believe in and take ownership for what they had achieved.

2. Another concern was the fact that despite the impressions of "happy ever after" that the film (unintentionally) conveyed, there were many ongoing struggles the community still faced. People who were "celebrities" to the outside world held responsible positions of leadership within the Alkali Lake community. They were needed at home in the continued struggle to build a healthy community.

3. A third issue had to do with money. Although the most in-demand Alkali Lake representatives held responsible jobs at home, they were also being paid handsome honorariums for public appearances from Alaska to Mexico. Some community members felt this was very unfair, both because the "celebrities" were benefiting personally from something that really belonged to the whole community, and also because they were being paid at home to do a job they were seen to be neglecting.

To their credit, Andy and Phyllis Chelsea tried to address these issues in various ways. A new Band enterprise called "New Directions Training" was initiated, and teams of community people were trained as trainers to work in tribal communities across Canada and the United States. Andy Chelsea also stepped down as Chief in order to bring others into the leadership circle.

Now, more than ten years after the film was released, the issues of who gets credit, who is asked to speak on behalf of the community, and who earns money still remain a source of irritation between some Alkali Lake people.

2. Sexual Abuse

Almost as soon as the "fog" of alcoholism was cleared away from the minds and hearts of Alkali Lake people, the issue of sexual abuse dawned on the horizon. As difficult and stubborn as the disease of alcoholism had been to face up to and resolve, no one ever dreamed that an even more difficult challenge would arise so quickly.

The fact that most Alkali Lake people had gone to treatment and stopped drinking did not mean that their healing process was complete. Years of accumulated loss and hurt do not simply disappear as a result of one therapeutic experience. What remains is a life-long journey into wellness that is exceedingly demanding because it requires that the traveller learn beliefs and values and new habits of thinking, feeling, acting and being in relationships with others. As explained above, Alkali Lake people became avid learners, involving themselves in many different kinds of training to strengthen their capacity to make this journey.

Another strategy that became very much a part of life in the “new” Alkali Lake was healing circles, A.A. meetings and other kinds of support groups. These meetings contributed significantly to rebuilding bonds of love, trust and acceptance among the people. Gradually, as people began to feel that it was safe to do so, they began to talk about some of the deeper hurts they were carrying that had been covered up by alcoholism. It soon became clear to community members such as the new Chief (Charlene Belleu) that some way had to be found to address the issue of sexual abuse. There had been a significant number of disclosures (all of which were women disclosing how they had been victimized), and there was mounting anger and denial of other community members (mostly men) refusing to really look at the issue.

With the help of trusted and experienced specialists (such as Maggie Hodgson from the Nechi Training Institute near Edmonton, Alberta and Dr. Cruz Acevedo from The Four Worlds Development Project out of Lethbridge, Alberta), a series of community workshops were held that eventually uncovered a startling revelation. Upwards of eighty percent of the entire community (women and men) of Alkali Lake had been sexually abused and many had become victimizers of others. Nearly every household was affected. Among the younger generation, community estimates say that as many as ninety percent of the community’s children and youth had been victims of sexual abuse.

In response to this challenge, new approaches to addressing sexual abuse had to be developed. The dominant (Euro-Canadian) justice system required all disclosures be reported to the police (and in the case of child victims to Child Protection Services). That system also required that “perpetrators” be prosecuted to the full extent of the law. As a Manitoba First Nations leader dealing with the same issue quipped, “What are we supposed to do? Build a fence around the whole community and turn it into a concentration camp?”

What Alkali people wanted was a process that promoted healing (defined as the restoration of balance). The Euro-Canadian legal system (and the intention behind the law) is driven by a desire to punish. Early on in the process, Alkali Lake people realized that abusers were very often people who had been victimized themselves. As they saw it, the real need was to interrupt the cycle of abuse, and to restore healthy relationships between their people. This culturally rooted philosophical difference eventually led to the development of a very different kind of approach that combines the involvement of the justice system (police, courts and the threat of imprisonment) with an intensive healing process which may (depending on the nature of the abuse) include the involvement of a forensic psychologist, a therapeutic counsellor or psychologist specializing in sexual abuse, a community-based counsellor, participation in a survivors or abusers support group, and a process of reconciliation involving the abuser, the victim(s), the families of the victims and the family of the abuser.

3. The Next Generation

At the time of Alkali Lake's "turnaround" (1979-82), the current generation of youth were either small children or not yet born. It was their parents' generation who courageously clawed their way out of the pit of community alcoholism. It was also their parents' generation who struggled through intensive healing and learning processes and, to this day, it is their parents' generation who continue to maintain their sobriety. However, as early as 1984, it was already becoming evident that the next generation of Alkali Lake people had their own battles to fight. As one Alkali Lake youth, currently (1996) in alcohol treatment commented, "That was then. This is now. They had their fun. Now it's our turn." Estimates vary, but at this writing, somewhere near twenty-five percent of the population of Alkali Lake uses alcohol, and almost all of these are young people.

Whose Story?

Anyone who tells a story does so from a point of view, and almost always with intentionality beyond the mere recitation of "the facts." In our telling of the story, we have relied on the following sources.

1. The in-depth personal interviews collected from some eighty community members in 1984/85 during the making of the film "The Honor of All: The Story of Alkali Lake."
2. Our own (considerable) personal interactions with the community in providing training and technical assistance between 1983 and the present.
3. The observation of our professional colleagues and associates who have worked consistently with Alkali Lake through the various phases of their healing and development process.
4. The observations and comments Alkali Lake people made to us, or to others. (We note with deep respect that Alkali Lake people have been and continue to be profoundly honest about what is, and what is not, happening in the continued process toward community wellness in Alkali Lake.)

What we have shared thus far may be compared to the experience of staring into a deep pool of water. There are several ways to look at the pool. One way provides us with a reflection of the sky, and perhaps of ourselves. The other, which requires looking deeply beneath the surface of the pool, reveals a whole dynamic world of aquatic life, filled with drama, beauty and mystery.

Thus far we have told a story that, while true, has skimmed over the surface of what really happened in Alkali Lake. What is reflected back to us fulfills our desire to see the

possibility of human transformation; and the triumph of the human spirit against seemingly impossible odds.

What is not told in our recounting of the Alkali Lake story has to do with the underlying dynamics of human transformation for health. Thus far we have only provided a two-dimensional sketch of the visible. We have not yet uncovered the “software” that make those surface dynamics possible.

Key Processes and Mechanisms for Change in Alkali Lake

In this section, we will briefly outline our understanding of the key processes and mechanisms that made the turn-around in Alkali Lake possible.

1. *Hitting Bottom* - At the point in the story where Ivy Chelsea refuses to go home with her mother, thereby triggering a chain of decisions and breakthroughs, the community had hit an all-time low. Every man, woman and child on the Reserve was being seriously impacted by alcohol. The pain was palpable. There were only two ways out—death or recovery. While it took a long time and a lot of help for people to begin choosing recovery, the conversation of the community was very focused on finding a way out. We note that later, when Andy was elected Chief, it was an almost one hundred percent practicing alcoholic electorate that voted him in, and he ran (and won) three times on a sobriety ticket. The community was reaching out for help with one hand, even as they denied it and pushed it away with the other.

2. *Leadership and Core Group Development* - Leadership played a critical role on the Alkali Lake process. Phyllis, Andy, and a few others first led the way by sobering up themselves and maintaining their sobriety as an example and as an attractive force for others to follow.

A second feature of their leadership was to create a “safe place” (i.e. a holding environment) within the larger community. This amounted to a small but gradually expanding core group of people who mutually supported each other in their healing journey. This group gradually developed new and more healthy ways of relating to each other and new approaches to pursuing the goals of successful life. Hence, they became a model community within the large community. They created a social space that others could move into when they wanted to make the shift.

A third feature of the leadership factor was the use of formal leadership mechanisms. Andy ran for and was elected as Chief, and he worked very hard to use the powers of Chief and Council to advance the community healing process. In this regard:

a. Leadership clearly kept the issue of healing very much in the forefront of community issues, refusing to be diverted from the primary objective of a sober community.

b. Chief and Council used their powers to challenge individuals to seek help. This was done by giving people who committed alcohol-related offences (drunk driving, battering, etc.) the choice of being charged or going to treatment.

c. All accounts we received reported that Andy and his councillors were rigorously fair and honest in the application of pressure. At one point, the mothers of both Phyllis and Andy Chelsea were charged with bootlegging.

d. As well, leadership was able to create an economic incentive system involving vouchers in lieu of cash for drinkers and jobs for those returning to treatment.

All of these steps took personal and political courage and a clear focus on the reasons why leadership had decided to run for public office.

A fourth and vital factor was the informal leadership roles played by many Alkali Lake people who used their own sobriety as a lever to encourage and support others in their families or in the community to sober up. This type of broad-based and continuous intervention and support process could never be maintained by a few people at the top of the formal leadership pyramid. It took individual initiative as well as formal leadership to shift a good dream into a sustainable reality.

3. Incentives and Opportunities Chain - In order for people to be able to imagine themselves living a healthier, alcohol-free life there had to be tangible opportunities and incentives that could be translated into the building material of a new way of life. Opportunities were needed for meaningful employment, for recreation and a social life that was alcohol-free and, most immediately, there had to be accessible and fairly continuous opportunities for healing, personal growth and learning.

What, in fact, was developed in Alkali Lake was a series of interconnected interventions and opportunities as well as built-in rewards and consequences that constituted a healing pathway.

a. The chain of events along this pathway began with a very loving and caring confrontation in which the person was encouraged to go to treatment and offered support, in the form of child care, transportation or whatever else was needed.

b. A part of the intervention included a promise to fix up the person's house while they were away.

c. People went to Round Lake (near Vernon, B.C.) or other centres for residential treatment.

d. Upon return to the community, there was a strong A.A. program (culturally adapted and changed to fit the community's reality). These meetings became a primary means of support and continued healing for many people.

e. When people were ready, a job was waiting for them. This opportunity immediately boosted the person's sense of self-worth and provided tangible proof that the healing journey was leading to a new and better life. Alkali Lake leadership worked very hard to create economic opportunities and by 1985, nearly everyone who wanted a job could get one.

f. Another key part of the chain was learning and personal growth opportunities. The Band provided numerous opportunities for people to be exposed to excellent training so that people could learn how to rebuild their interior lives as things improved in the community.

Thus, someone wishing to sober up entered the chain through loving encouragement and challenge with the promise of a better life, and found themselves moving easily from one phase to the next, rewarded and supported as they found their way into a new pattern of life.

4. *Cultural and Spiritual Foundations* - A key element in the Alkali Lake transformation was a conscious placing of spirituality in the center of the process. This involved a rediscovery of Native spiritual traditions and tools such as the sweat lodge, the sacred pipe and other ceremonies. It also involved a conscious openness to and acceptance of religious diversity. Every aspect of family and community life began to again acquire the ceremonial markers that help to guide people on their journey through life reminding them of their sacred responsibilities and boundaries. Moral values and spiritual teachings again become central in the education of children in community governance and in family life. We believe this “software dimension” of recovery was a very powerful element in the success Alkali Lake people were able to achieve in their struggles to transform their community.

Concluding Remarks

Alkali Lake has “broken the mold.” They have stepped outside the patterns of addiction (and later abuse), and in doing so have inspired a generation of Aboriginal people to do the same.

Their generosity in sharing their story with the world and their continued commitment to support other communities in the healing journey are well known to many. What is not so well known is the nitty gritty details about how Alkali Lake was able to make the changes they did.

In this brief case study, we have attempted to move beyond the story in order to draw out generic lessons that other communities may be able to apply to their healing journeys. More than a decade has passed since the film “The Honour of All” was released and still, their story is fresh and relevant and we believe that there is much still to be learned from their example. —————

Previously published: *The Story of Alkali Lake Community* (Esketemc First Nation) by Phil Lane, Jr., Michael Bopp, Judie Bopp, Julian Norris (Four Directions International/ Four Worlds Institute for Human and Community Development). <https://www.4worlds.org/4w/ssr/Partiv.htm>

Free Your Mind and Your Addiction Will Follow

by Alan Muskat

I'd rather be whole than good.

attributed to Carl Jung

Nonviolent Communication, or NVC, founded in the 1960's by Marshall Rosenberg, shows how addiction can stem from how we think. How we think is expressed in how we talk, especially to ourselves. If we talk violently to ourselves, addiction is likely. If we approach ourselves with compassion, recovery will take its place.

Violent thinking is based on moralistic judgments. When we think of ourselves in terms of "good" or "bad," we foster addiction. When, instead, we address our real needs, addiction falls away.

Language reflects culture. And our culture, says Rosenberg, is based on the assumption that people are bad: that is, selfish and sinful. If people are inherently bad, it means you have to teach them to be good. You need a system to train and force them, if necessary, to "behave." You have to dominate them.

This is domination culture, more commonly known as "The System." This authoritarian approach to human behavior readily fosters addiction. To move beyond this moralistic mindset is to recover a true sense of self. When we embrace ourselves as we are, we can feel whole again.

Father Knows Best

You have to dominate. If you don't dominate, you're wasting your time.

- Donald Trump

Growing up in any culture is a process of socialization. As social animals, we inherently feel shame, which is the impulse to act only in ways approved of by society. We learn how to act from our parents. We naturally try to fit in.

Trying to force ourselves or others to fit in, however, pits parent against child, government against citizen, corporation against consumer, and mind against body. Life becomes all about control: how to get people to do what you want them to do by getting them to think it's what they should do. It's a top-down approach, from head of state to our own mental state.

Institutionalized violence stems from the idea of having to obey authority. This belief system tells you to trust the experts because you can't trust yourself. Domination

culture capitalizes on our sense of shame by turning it from a learning tool to an instrument of subjugation.

Who Holds the Key?

Domination culture is as old as civilization, but human beings have been around a lot longer than that. We have always lived in groups, and to the best of our knowledge, these groups were always fiercely egalitarian. Domination was not tolerated. After all, it was contrary to our nature, to the way humans evolved to survive.

What happened? Was it the rise of hierarchical societies that prompted those in power to concoct the myth of the “bad” human? Are they, and those currently in power, the real bad guys?

No. There are no “bad guys.” That’s just the same myth redirected.

Is it just a bad system? No, that doesn’t work either. To re-establish a culture that works, one that doesn’t lead to addiction, we have to look beyond ideas of “good and “bad” or “right” and “wrong.”

Domination culture is not “bad” or “wrong.” It’s simply where we’re at. Like anything else, it has its advantages and disadvantages.

To be able to choose a different way, we need to be able to focus not just on what we don’t want, but on what we do want. Moving beyond addiction means living with less pushing away and more moving toward. As therapist Jodi Rodgers says, we heal not just from but to.

As I talk about liberation, then, remember that resentment is, as they say, like drinking poison and waiting for the other person to die. “Have you forgiven your captors?” asks Jack Kornfield. If not, he points out, you are still captive.

Scared Straight

He sees you when you’re sleeping

He knows when you’re awake

He knows if you’ve been bad or good

So be good for goodness sake

Picture being taken out of nature, put into a classroom, and forced to sit still in rows facing a teacher. You are punished for what you do wrong and rewarded for what you do right. This is the process of taming a wild animal. Socialization is domestication.

Being raised in our society is like being trained to be a circus act, jumping through hoops to avoid the whip and earn a treat. We live in deep anxiety, in constant fear of violent punishment, which we call “retributive justice.” Usually just the threat of violence is enough.

For a social animal, disapproval alone is intensely painful. We split off and push parts of ourselves into the shadow in order to get approval. If a disapproving glance isn’t

enough, and words of disapproval don't suffice, next comes the threat of violence, including eternal damnation, and finally, physical violence itself.

We talk about the slavery of addiction, but by the time we get addicted, we are slaves already, inside and out. Wage slavery rules our body; 'should' slavery rules our mind. In a performance-based society, to "deserve" anything, you have to earn it.

By the same token, domination culture makes it a harrowing prospect to ever admit you were "wrong," that is, that you did something that others may not approve of. This socialization replaces our own natural pleasure/pain, positive/negative reinforcement system with an external one. Our real needs go unmet because we fear the punishment that can come from meeting them.

Round Pegs in Square Roles

In domination culture, "parent" and "child" are not necessarily healthy, natural roles. They can be, but when these roles take over the relationship, then there is power over, that is, domination, with the threat of rejection if not violence. Then the relationship can no longer be authentic: mutually honest and free.

Of course, there are times when a parent may find it necessary to force their child to do something. But those times should be rare, and they need to be "repaired" every time. Force wounds people, and those wounds must be healed.

In domination culture, force is commonplace and healing is rare. Parents are often not guided by what meets their children's needs because they're not guided by what meets their own. They're guided by society, and our culture isn't primarily concerned with meeting needs.

Modern cities, for example, aren't designed for people; they're designed for industry. Public schooling, like the prison system, is an industry as well. We are taught to believe that we live in an egalitarian society, but even democracy is "might makes right." It's rule of the majority — at best.

Who's Bad?

Violence is abuse, and "an abusive system is designed to protect the abuser." We're told that it's for our own good. Do the authorities actually believe that, or are they just using this story to manipulate the masses?

It doesn't matter. Like I said, this isn't about who started it or who's continuing it. The premise of NVC is that no one is "bad." "There are no enemies here... Those who are doing these things are human beings like the rest of us." No human being is "evil." Consequently, there is no one to blame.

This is not about victims and perpetrators. We are all, every one of us, always doing the best we can. If you get angry reading about domination culture, it means you have needs to meet. It doesn't mean you need revenge. That's just part of the old "good" vs. "evil" mindset.

Reverse Psychology

In the Chinese philosophy of nature, nature has no boss. There is no principle that forces things to behave the way they do... Nature, human nature included, is an organism, and an organism is a system of orderly anarchy. There is no boss in it, but it gets along by being left alone and being allowed to do its stuff...

I must trust myself to a nature which doesn't have a boss. Because a boss is a system of mistrust.

NVC reminds us that human beings naturally care for others. This is not to say that we are inherently "good." It simply means that we are innately social creatures, as neuroscience clearly shows. In domination culture, we are habitually scared into thinking only of ourselves. The System achieves the opposite of what it purportedly sets out to do.

We live under the "rule of law," yet it's because laws are unnatural that they need to be enforced. In a natural world, laws are unnecessary. As social animals, shame (a.k.a., conscience) is the built-in force that motivates us to do what's "right."

Like the early taoists pointed out, laws are what you need once real caring for each other is lost. That's when you need force: when our natural inclinations have been suppressed. This view is central to anarchism and common to many feminist thinkers as well.

Everyone pays for this. What anyone gains in status or power, they lose in isolation. It's lonely at the top. Yet the system is self-perpetuating. It's inherently addictive because it's a byproduct of thinking itself.

When Thinking is the Box

Our eyes are not only viewers, but also projectors that are running a second story over the picture we see in front of us all the time. Fear is writing that script and the working title is, 'I'll never be enough.'

The idea of humans being sinful is central to fall/redemption Christianity. But there's nothing uniquely Christian about being moralistic and punitive. It's present in any culture that categorizes people with qualitative judgments. Labels like "mentally ill," "drug-dependent," and "alcoholic" turn people into things and lead to self-fulfilling prophecies.

Church and state are no different in that both impose laws, a.k.a., commandments. Whether Buddhism, for example, is a religion depends on whether it is merely descriptive, that is, telling us the way things are, or proscriptive, telling us the way things should be, including how we should behave.

However, all description is proscriptive in that it postulates a paradigm, a worldview which, to a great extent, influences behavior. Like Don Coyhis, founder of the Native American recovery nonprofit White Bison says, "if you want to care for something, you call it a flower. If you want to kill something, you call it a weed." We see what we're taught to see, and "what you see is what you get."

I Think, Therefore I'm Lonely

In Nisbett's book, *The Geography of Thought*, there is an illustration: a drawing of a chicken which is labeled A, and a drawing of grass which is labeled B. Underneath the two drawings is a drawing of a cow, and the question asked is: "What goes with this: A or B?"

Researchers found that American children linked cow with chicken since they were both classifiable objects belonging to the same "taxonomic" category. Chinese children said the cow and grass go together because "the cow eats the grass."

In the Western tradition, traceable back to the ancient Greeks, children are taught to classify objects according to rules, while in the Eastern tradition, children are taught that everything is connected to everything else, and so they look for relationships...

We all learn to speak this language from birth, and in so doing, our alienation from each other happens completely out of awareness. We accept our loneliness as being the natural state, when it really is not.

Human language has the allure/danger of explaining the world, which is why we often end up worshipping the word, including collections of words, that is, books, including *The Bible* (which simply means "the book"). But a language based on classification, on separating right from wrong and putting everything in its proper place, can have dire consequences. One of them, a major driver of addiction, is social isolation.

Ideas can alienate us not only from others but from ourselves. After all, any form of identification, as in "I am _____," is a static, artificial proposition. The Twelve Step label of "addict," for example, can be contrived, self-perpetuating, and mask what's really going on. Some have even proposed a modification of English language to avoid such pronouncements, sometimes referred to as "stinking thinking."

Three's Company Too

Rumi's love and honor for all religious traditions was not always popular in his day, and often provoked criticism from the more dogmatic. A story is told that one such public challenge came from a Muslim dignitary, Qonavi, who confronted Rumi before an audience. "You claim to be at one with 72 religious sects," said Qonavi, "but the Jews cannot agree with the Christians, and the Christians cannot agree with Muslims. If they cannot agree with each other, how could you agree with them all?" To this Rumi answered, "Yes, you are right, I agree with you too."

Sufis don't hold much stock in labels or belief systems, which carve up the world and segregate us within it. The hazards of human thinking are why, in NVC, we speak from experience rather than judgement, distinguishing an interpretation from an observation, opinion from fact. It's one thing to say, "you left the house at 8:30." It's another to say, "you abandoned me."

Ideas are like the internet: they can take us away from real life. Used carefully, on the other hand, they can bring us back to it. Ideas can, ideally, connect us to others and ourselves. NVC, for example, makes use of a list of about seventy-five basic human needs, from "air" to "meaning." A list is just a bunch of words. But words can help us to recognize and distinguish our actual needs, that is, what is truly "alive for us." It all depends on the intention.

Is the intention to meet just some people's needs or everyone's? Is it to meet all your needs or just a few? For one or more people to live long and well, no one and no one need can be left out. Human society is a package deal.

Can't Touch This

The people we call addicts tend to be the most sensitive people in the family. They tend to be deeply empathic, which means they feel everybody else, often times more acutely than they feel themselves, largely because they weren't allowed to have a self, either because it was too dangerous to be a self, or they were constantly told that who they were – what they were expressing – was incorrect or ridiculous or whatever, and they learned to survive by denying what their own experience was...

I think usually people are just terrified to feel, particularly addicts...

What's alive for us is always what's going on in our bodies. In order for people to function in a domination culture, that is, to be obedient, they have to be out of their bodies, where they feel their feelings, and in their heads, where instead, they think about the ideas of "right" and "wrong" handed to them.

Once you're thinking in terms of right and wrong, once you believe that you need to listen to the authorities, then, when your feelings come up, pointing to your own, forbidden needs, you are bound to think, "there must be something wrong with me. I can't trust my own body."

This is biophobia, fear of nature: specifically, human nature. It's why therapy can be more effective when it has a somatic component, because the body is where the truth, the "shadow," resides.

Mr. Big Stuff

Don't think I need anything at all.

Pink Floyd, "Another Brick In The Wall"

One of the most familiar commandments of domination culture in the modern era is "Thou Shalt Shop." To stuff your feelings and "buy into" society means to buy stuff. For most of us, that means working to earn the money to do so. Even having the money is not enough because we are taught that happiness also comes from status, power, etc. Since these things don't meet our real needs, we continue in the rat race, the hamster wheel. We work harder and harder to get what we don't really need while most of our basic needs go unmet. You can never get enough of what you don't really need.

When needs go unmet, we feel pain. They create "noise in the system." Our culture teaches us to block it out. We "shoot the messenger" by killing the pain with painkillers, or we distract ourselves with addictive behaviors. These two approaches correspond to fight and flight, respectively. We may even blame others for causing our feelings, a result of being ruled by outside forces, of externalizing control.

Taking the place of self-control is the internalized voice of authority. We develop “hang-ups” that are really the fear of being hung, as in lynched. We’re imprisoned in our own minds, so a common, logical response is depression.

Highway to Hell

*As soon as you’re born they make you feel small...
Till the pain is so big you feel nothing at all...
They hurt you at home and they hit you at school...
Till you’re so fucking crazy you can’t follow their rules...
Then they expect you to pick a career
When you can’t really function you’re so full of fear*
John Lennon, “Working Class Hero”

Marshall Rosenberg, citing Ernest Becker, says depression stems from “cognitively-arrested alternatives,” that is, feeling trapped. Imagine someone following you around all day, constantly telling you all the things you’re not doing right. Where can you run? How can you fight back? How do you shut it off? What extremes would you go to to get them to just shut up?

One of the most common ways to shut off this inner dialogue is through substances. Drinking, for example, gives us some relief from the torment. Nicotine, video games, or anything that focuses our attention are all known to switch off self-talk.

To soothe the pain of unmet needs, we do whatever we can get away with. The more severe the pain, the more extreme the measures: the more willing we are to break the law. Addiction can even be a form of rebellion: a last, desperate stand against The System. After all, the “war on drugs” has always been a war on the individual.

The real intoxication is internalizing toxic shame. This happens long before physical intoxication, which is one way of fighting back: to try to silence the silencer, to poison the poison.

How Can I Help?

Gabor Maté offered a surprising response when asked how parents should deal with a drug-addicted daughter. “The first step is they’re going to have to be perfectly okay with their daughter using,” Maté replied. “They have to be perfectly okay with this. Say, ‘this is what’s happening.’ Not resist it or resent it. Not wish her to be different. Not work to make her different than the way she is. Because what this girl did not get in the first place was unconditional loving acceptance—not because they didn’t intend it, but because they couldn’t deliver it because of their own stuff.”

The point of harm reduction, a noncoercive approach to addiction, is to stop trying to get people to do what we want them to do. In NVC, that’s the last thing we want. With NVC, we don’t try to control people, to get them to change their behavior. “The more important the desired outcome... the more important it is not to make commands.”

When someone is doing something we don't think is good for them, the most helpful objective is not to get them to stop. It's to help them to find other ways of meeting whatever needs their behavior is meeting at less cost to themselves. Judging or blaming them only makes things worse. Better to communicate that you understand that they are doing the best thing they can possibly do.

And we do it together. NVC is collaborative, not pedantic. It's not about convincing people of anything; it's about really connecting. We can't help others by treating them like rats or guinea pigs in an experiment designed to produce measurable outcomes. In domination culture's grand experiment, these include becoming law-abiding, tax-paying citizens. To treat yourself this way is to set yourself up for failure and addiction.

Free to be You and Me

Above all, NVC is about getting us back into our hearts. As long we're stuck in our heads, we will never break out of our invisible prison. Real recovery is not about "getting your life back together," "healing," or "becoming a better person" any more than it is about "getting clean," "staying sober," or even staying alive. Those can all just be different ways of beating up on yourself. The bottom line is that bettering is battering. The point is not self-improvement or even self-preservation but self-acceptance.

"Hold yourself," says The Buddha, "as a mother holds her beloved child." Be the parent you may not have had. Welcome your feelings and they will tell you your needs. Free your body and your mind will follow.

Originally from: Alan Muskat (2020) <http://www.alanmuskat.com/free-your-mind/>

Nonviolent Communication Skills and Addiction

by PuddleDancer Press

“One of the many ways Nonviolent Communication (NVC) has blessed my life is that it has helped me learn to relate to an addictive substance user in a clearly non-shaming, non-coercive manner.”

-Wayland Myers

Understanding the relationship between Nonviolent Communication and addiction can help you understand where to apply these powerful tools to intervene in the addiction process as well as to support recovery from addiction.

Addiction is a complicated and painful issue that affects individuals and families regardless of wealth or income level. The United States has gone through a devastating opioid addiction crisis. Addiction to alcohol and other drugs, as well as to substances like tobacco, continues to negatively impact individuals, families, organizations, and economies worldwide.

Nonviolent Communication sees the use of any substance as an attempt to meet some deeper universal human need. The strategy of using a substance, is only that: a strategy. The underlying motivators — or needs — could vary greatly in any given situation or from person to person.

NVC helps you develop the inner clarity to understand, “what need am I or was I — or someone else — trying to meet?” When you understand an underlying need or motivator, and de-link it from a specific strategy, we find that there may be many strategies for meeting the same need or set of needs.

The relationship between Nonviolent Communication and addiction, on a societal level, sees substance abuse as a public health issue to be addressed with compassion and treatment, rather than a criminal issue to be treated with punishment.

The Importance of Healthy Communication in Recovery from Addiction

It’s easy to overlook the importance of healthy communication in recovery from addiction.

Addiction can severely damage our relationship with ourselves and with others. Therefore, an important part of recovery is repairing our relationships with others and recovering our self-esteem.

One of the hallmarks of addiction is a loss of trust in the relationships. If you or someone you know is going through recovery, understand that it may take time to rebuild trust.

Despite words and actions having changed — despite a greater amount of integrity, congruence, follow-through — trust may take longer to rebuild with some people.

The importance of healthy communication in recovery from addiction can be looked at from at least two perspectives:

- 1 how we communicate with ourselves (intrapersonal communication) and,*
- 2 how we use communication with others (interpersonal communication) to repair and rebuild trust.*

NVC gives you tools for both your communication with yourself and with others — so that trust and healing to move forward.

Using Nonviolent Communication Skills in Recovery for Healing and Growth

If someone in recovery from addiction feels guilt because of the impact of their addictive behaviors on other people, or if they feel shame for having been in an addictive process, their recovery will be supported or limited by the quality of their intrapersonal communication (how they communicate with themselves).

Using Nonviolent Communication skills in recovery for healing and growth means transforming the cycle of guilt, shame, and depression into one of connection with our deeper motivators (Universal Human Needs) so that we can find other behaviors that are more life-serving.

The more a person who is addicted or who is in recovery from addiction engages in self-talk that perpetuates guilt, shame, and depression, the harder it will be to free themselves mentally from the addictive process.

The more a person who is addicted or who is in recovery from addiction can engage in a process of healthy mourning and self-forgiveness, the sooner they can transcend the cycle of beating themselves up and feeling stuck where they are. This is what it means to use Nonviolent Communication skills in recovery for healing and growth.

Addiction is loaded with guilt and shame, so it follows that an important part of recovery is for a person to restore the relationship with themselves.

This highlights the importance of Nonviolent Communication skills — especially healthy intrapersonal communication — in recovery from addiction.

Using Nonviolent Communication for Healthy Relationships in Recovery

In addition to how the addiction process impacts self-esteem and self-trust, substance abuse severely impacts trust in relationships.

Using Nonviolent Communication for healthy relationships in recovery means developing, restoring, or recovering a high quality of connection with the people who are important to us, especially when those relationships have been impacted by addiction.

Trust is like topsoil. It can erode quickly, and can take a long time to build back up.

Being clear within ourselves, being clear with others, and consistently acting from a place of high integrity — these go a long way toward rebuilding trust.

Acting from a place of high integrity means doing what we say and saying what we do. Inner clarity supports this too because if I am clear within myself I am less likely to over-promise or agree to things that are not doable or which I'm not actually willing to do.

Using Nonviolent Communication for healthy relationships in recovery and restoring trust also means that if I fall short of keeping a promise I can own it, empathize with others regarding the impact, go through a process of sincere mourning, give empathy to the part of me that fell short, and try again.

Much more than having a perfect track record, our humility and sincere efforts contribute greatly to rebuilding trust.

Using Nonviolent Communication for healthy relationships in recovery involves at least three areas:

1 self-connection: in any given moment, knowing what I'm observing, feeling, needing, and wanting; I then bring this increased clarity to my interactions;

2 honesty: being willing to be transparent, real, and to disclose what is happening for me; relationships are built on connection, and if I'm not real and honest, others' connection to me will be restricted;

3 empathy: being willing to listen from the heart to another's feelings, needs, and requests. This in itself goes a long way toward rebuilding trust and connection.

Using Nonviolent Communication for Relationships After Recovery

These same three areas are essential in using Nonviolent Communication for relationships after recovery.

Self-connection is either a supportive or a limiting factor for both empathy and honesty.

If I am triggered or flooded with emotion, it is difficult to listen from a place of non-judgmental presence!

If I am disconnected from myself — and I don't even know what I'm feeling or needing — then I am very limited in my capacity to speak honestly.

Using Nonviolent Communication for relationships after recovery means continuing to stay self-connected, learning and developing feelings and needs vocabulary, and augmenting my capacity to listen empathically as well as to speak courageously from the heart.

Dr. Marshall Rosenberg on NVC and Addiction

Understanding Dr. Marshall Rosenberg on NVC and addiction includes his insight that any time we speak or act, it's in service to a Universal Human Need.

He also knew that the specific strategies we use do not always satisfy the need we are intending.

Sometimes a strategy directly contributes to a need. For example, I have hunger, I have a need for food or nourishment. I eat some healthy food, and that need is fulfilled.

But sometimes the strategy meets some needs at the expense of other needs, and sometimes it leads us entirely away from having those needs satisfied. It's these last two categories that we often find the behaviors associated with addiction.

Some of the insights from Dr. Marshall Rosenberg on NVC and addiction include being radically honest with ourselves, and availing ourselves of the strategies that truly support health and life. These can include NVC practice, reaching out to friends and family, as well as 12-Step Programs.

Originally from: PuddleDancer Press, 2022 <https://www.nonviolentcommunication.com/learn-nonviolent-communication/nvc-addiction/>

[Yes, one has to spell addiction incorrectly to get to the right address.]

William James, Bill Wilson, and the development of Alcoholics Anonymous (A.A.)

by John D. McPeake

Abstract

William Griffiths Wilson, the acknowledged founder of Alcoholics Anonymous (A.A.), says in many of his writings that William James, through his book, *The Varieties of Religious Experience: A Study in Human Nature* (2002), was a co-founder of A.A. Despite this, William James and his work do not appear to be well-known within the circles of individuals interested in alcoholism and recovery from alcoholism through A.A., the premier recovery organization. This article seeks to provide the reader with a description of Bill Wilson's pivotal spiritual experience and similar experiences catalogued by James. Then James' major ideas on spiritual experience are outlined followed for comparison by a similar outline of the main ideas from Alcoholics Anonymous (2001). The discussion traces the impact of James' ideas on A.A.'s early development. It is to be hoped that this discussion will stimulate a renewed interest in and broad discussion of spiritual experience and its role in recovery from alcoholism.

1. Introduction

In December of 1934 Bill Wilson was in Towns Hospital off Central Park in NYC for what would be his last detoxification. During this hospitalization Bill had a dramatic "spiritual experience." Bill describes this dramatic experience in his history of A.A. (1957, p.63):

"My depression deepened unbearably and finally it seemed to me as though I were at the bottom of the pit. I still gagged badly on the notion of a Power greater than myself, but finally, just for the moment, the last vestige of my proud obstinacy was crushed. All at once I found myself crying out, 'If there is a God, let Him show Himself! I am ready to do anything, anything!'

Suddenly the room lit up with a great white light. I was caught up into an ecstasy which there are no words to describe. It seemed to me, in my mind's eye, that I was on a mountain and that a wind not of air but of spirit was blowing. And then it burst upon me that I was a free man. Slowly the ecstasy subsided. I lay on the bed, but now for a time I was in another world, a new world of consciousness. All about me and through me there was a wonderful feeling of Presence, and I thought to myself, 'So this is the God of the

preachers!’ A great peace stole over me and I thought, ‘No matter how wrong things seem to be, they are still all right. Things are all right with God and His world.’”

While this sudden and dramatic spiritual experience stands alone as an aspect of Bill’s personal experience, a number of antecedents probably played some role and prepared Bill for the experience. Several events that happened immediately afterwards are also worth considering.

Bill had been raised in the Vermont village of East Dorset in a Calvinistic tradition that his grandfather who he admired, had rejected. As an adult Bill had a long and agonizing history of heavy drinking seemingly coupled with unbearable depression. Dr. William Silkworth, the Medical Director at Towns, who was Bill Wilson’s physician, friend, and mentor, had told him that he was an alcoholic and that alcoholism was a hopeless disease, without a known cure.

In the weeks prior to the spiritual experience described above, Bill had been going to Oxford Group meetings and to some mission meetings in the Bowery with his old school friend, Ebby Thatcher. Ebby had stopped drinking as a result of his experiences with the Oxford Groups. Ebby’s neat little summary of the Oxford Group’s spiritual program -which he repeated before leaving Bill’s hospital room just prior to Bill’s dramatic spiritual awakening - was: “You admit you are licked; you get honest with yourself; you talk it out with somebody else; you make restitution to the people you have harmed; you try to give of yourself without stint, with no demand for reward; and you pray to whatever God you think there is, even as an experiment (1957, pp. 62-63, see p. 160 for a slightly more formal rendering of the OG six steps).” This is the beginning of the impact of one alcoholic talking to another. Bill was aware that another Oxford Group friend of Ebby’s, also an alcoholic, had been told by no lesser an expert than C.J. Jung that he was a hopeless alcoholic and only a vital spiritual experience would alleviate his disorder.

After Bill Wilson’s spiritual experience, Dr. Silkworth confirmed that he was not “crazy” but that he had had just the sort of spiritual experience that sometimes cures alcoholics. The next day Ebby brought Bill a copy of William James’ book *The Varieties of Religious Experience: A Study in Human Nature* (VRE). This book contained the Gifford Lectures that were delivered in 1901-1902 and subsequently published as a book (2002) that Bill “...devoured from cover to cover (1957, p. 64).” This remarkable book is still in use today in the fields of psychology, religion, and philosophy (see for example, Charles Taylor’s (2002) *Varieties of Religious Today: William James Re-Visited* or Bridgers, L. (2005) *Contemporary Varieties of Religious Experience*. Lanham MD: Lanham, Rowman and Littlefield). VRE provides detailed examples of spiritual experiences similar to Bill’s and describes their causes, meanings and consequences.

Bill would have to wait until late spring 1935, when chance took him to Akron, Ohio. There he met Dr. Robert Smith and re-learned the essential lesson that infuses A.A.: it is the power of one alcoholic talking to another alcoholic about the consequences, but particularly the feelings, engendered by this hopeless illness that can lead to lifelong sobriety.

From that day forward, several facts about alcoholism became manifest. Alcoholism was an illness. Alcoholism crushed its victims by making them feel hopeless. There was no “cure” but there was a “spiritual solution,” centered on alcoholics helping each other to refrain from drinking. These positive experiences led to the publication in 1939 of *Alcoholics Anonymous*, containing A.A.’s program of recovery, the Twelve

Steps, a version of Ebby's "neat little formula," and the shared experiences described in the stories of recovering alcoholics that make up the majority of the book.

Much of the material identified above has been discussed and written about in some detail and is familiar to many recovering people. What often surprises otherwise knowledgeable individuals, however, is Bill Wilson's claim that he regarded William James (WJ) as a "founder" of A.A. (1957) and that the VRE was one of a small number of books consulted early and often by the people who founded A.A. William James is cited in the text of *Alcoholics Anonymous*, one of only two outside sources cited, Carl Jung is the other, and in the second edition (1955) several footnotes reference the then new Appendix II: "Spiritual Experience," which discusses William James' view of spiritual experience, particularly the distinction between the sudden experience of Bill, described above, and the more common, gradual, or educational variety, experienced by the majority of A.A. members. According to Robertson (1988) "He (Wilson) studied *Varieties* for months, was completely gripped by it, and urged everyone in sight to read it and learn from it. (p. 60)" What I purpose to do in this paper is to review VRE and reflect on its possible impact on Bill Wilson and its relationship to spiritual development within A.A.

Section 2: A brief note on William James

For the reader familiar with William James, no introduction is needed. For the reader unfamiliar with William James these two paragraphs from one of the many recent biographies of James (Richardson, 2006) may be helpful in appreciating James' significance: "Alfred North Whitehead said, 'In Western Literature there are four great thinkers, whose services to civilized thought rest largely on their achievements in philosophical assemblage; though each of them made important contributions to the structure of philosophical system. These men are Plato, Aristotle, Leibniz, and William James.' John McDermott says, 'William James is to classic American philosophy as Plato was to Greek and Roman philosophy, an originating and inspirational fountainhead.' James is famous for pragmatism (which he sometimes felt he should have called humanism), though he should be remembered for his radical empiricism (which could be called phenomenology); that is, his belief that reality is confined to what we experience, with the crucial proviso that nothing we experience can be excluded.

His book *The Will to Believe* was about the right to believe, and his *Varieties of Religious Experience* made religion possible for many educated moderns who are uncomfortable with the authority of churches and dogmas. The book is also a cornerstone of the modern field of comparative religion. Though it is nearly a hundred years since James died, his thought is still very much alive. 'I find him visibly and testably right,' says Jacques Barzun. 'He is for me the most inclusive mind I can listen to, the most concrete and the least hampered by trifles. (2006, p. xiv)'

Section 3: Five Cases From William James' (WJ's) *Varieties of Religious Experience* (VRE)

What is striking about VRE and what must have grabbed Bill Wilson's attention immediately—is that VRE contains case histories of spiritual experiences like Bill's. Some are even more dramatic and powerful than his, drawn from the religious and

secular literature. I have included five examples of religious experience taken from the pages of VRE. It is worth noting here that these experiences, called religious experiences by James, are what members of A.A. would call “spiritual experiences”: personal, subjective, emotionally profound encounters with what the subject of the case views as the “spiritual.” It is also worth noting that most members of A.A. do not have the type of dramatic experience described by Bill in the foregoing example, nor the even more dramatic examples described below.

1. GEORGE FOX (2002, pp. 10-11)

George Fox was the founder of The Society of Friends, also known as the Quakers, and widely regarded by his peers as a highly intelligent and substantial person.

“As I was walking with several friends, I lifted up my head, and saw three steeple-house spires, and they struck at my life. I asked them what place that was? They said, Lichfield. Immediately the word of the Lord came to me, that I must go thither. Being come to the house we were going to, I wished the friends to walk into the house, saying nothing to them of whither I was to go. As soon as they were gone I stept away, and went by my eye over hedge and ditch till I came within a mile of Lichfield; where, in a great field, shepherds, were keeping their sheep. Then was I commanded by the Lord to pull off my shoes. I stood still, for it was winter: but the word of the Lord was like a fire in me. So I put off my shoes and left them with the shepherds; and the poor shepherds trembled, and were astonished. Then I walked on about a mile, and as soon as I was got within the city, the word of the Lord came to me again, saying: Cry, ‘Wo to the bloody city of Lichfield!’ So I went up and down the streets, crying with a loud voice, Wo to the bloody city of Lichfield!’ It being market day, I went into the market-place, and to and fro in the several parts of it, and made stands, crying as before, Wo to the bloody city of Lichfield! And no one laid hands on me. As I went thus crying through the streets, there seemed to me to be a channel of blood running down the streets, and the market-place appeared like a pool of blood. When I had declared what was upon me, and felt myself clear; I went out of the town in peace; and returning to the shepherds gave them some money, and took my shoes of them again. But the fire of the Lord was so on my feet, and all over me, that I did not matter to put on my shoes again, and was at a stand whether I should or no, till I felt freedom from the Lord so to do: then, after I had washed my feet, I put on my shoes again. After this a deep consideration came upon me, for what reason I should be sent to cry against that city, and call it The bloody city! For though the parliament had the minister one while, and the king another, and much blood had been shed in the town during the wars between them, yet there was no more than had befallen many other places. But afterwards I came to understand, that in the Emperor Diocletian’s time a thousand Christians were martyr’d in Lichfield. So I was to go, without my shoes, through the channel of their blood, and into the pool of their blood in the market-place, that I might raise up the memorial of the blood of those martyrs, which had been shed above a thousand years before, and lay cold in their streets. So the sense of this blood was upon me, and I obeyed the word of the Lord.”

2. MR. S. H. HADLEY (2002, pp. 223-225)

“One Tuesday evening I sat in a saloon in Harlem, a homeless, friendless, dying drunkard. I had pawned or sold everything that would bring a drink. I could not

sleep unless I was dead drunk. I had not eaten for days, and for four nights preceding I had suffered with delirium tremens, or the horrors, from midnight till morning. I had often said, 'I will never be a tramp. I will never be cornered, for when that time comes, if ever it comes, I will find a home in the bottom of the river.' But the Lord so ordered it that when that time did come I was not able to walk one quarter of the way to the river. As I sat there thinking, I seemed to feel some great and mighty presence. I did not know then what it was. I did learn afterwards that it was Jesus, the sinner's friend. I walked up to the bar and pounded it with my fist till I made the glasses rattle. Those who stood by drinking looked on the scornful curiosity. I said I would never take another drink, if I died on the street, and really I felt as though that would happen before morning. Something said, 'If you want to keep this promise, go and have yourself locked up.' I went to the nearest station-house and had myself locked up.

"I was placed in a narrow cell, and it seemed as though all the demons that could find room came in that place with me. This was not all the company I had, either. No, praise the Lord; that dear Spirit that came to me in the saloon was present, and said, Pray. I did pray, and though I did not feel any great help, I kept on praying. As soon as I was able to leave my cell I was taken to the police court and remanded back to the cell. I was finally released, and found my way to my brother's house, where every care was given me. While lying in bed the admonishing Spirit never left me, and when I arose the following Sabbath morning I felt that day would decide my fate, and toward evening it came into my head to go to Jerry M'Auley's Mission. I went. The house was packed, and with great difficulty I made my way to the space near the platform. There I saw the apostle to the drunkard and the outcast—that man of God, Jerry M'Auley. He rose, and amid deep silence told his experience. There was a sincerity about this man that carried conviction with it, and I found myself saying, 'I wonder if God can save me?' I listened to the testimony of twenty-five or thirty persons, every one of whom had been saved from rum, and I made up my mind that I would be saved or die right there. When the invitation was given, I knelt down with a crowd of drunkards. Jerry made the first prayer. Then Mrs. M'Auley prayed fervently for us. Oh, what a conflict was going on for my poor soul! A blessed whisper said, 'Come'; the devil said, 'Be careful.' I halted but a moment, and then, with a breaking heart, I said, 'Dear Jesus, can you help me?' Never with mortal tongue can I describe that moment. Although up to that moment my soul had been filled with indescribable gloom, I felt that glorious brightness of the noonday sunshine into my heart. I felt I was a free man. Oh, the precious feeling of safety, of freedom, of resting on Jesus. I felt that Christ with all his brightness and power had come into my life; that, indeed, old things had passed away and all things had become new.

"From that moment till now I have never wanted a drink of whiskey, and I have never seen money enough to make me take one. I promised God that night that if he would take away the appetite for strong drink, I would work for him all my life. He has done his part, and I have been trying to do mine."

3. THE OXFORD GRADUATE (2002, pp. 244-246)

"Between the period of leaving Oxford and my conversion I never darkened the door of my father's church, although I lived with him for eight years, making what money I wanted by journalism, and spending it in high carousal with any one who would sit with me and drink it away. So I lived, sometimes drunk for a week together, and then a terrible repentance, and would not touch a drop for a whole month.

“In all this period, that is, up to thirty-three years of age, I never had a desire to reform on religious grounds. But all my pangs were due to some terrible remorse I used to feel after a heavy carousal, the remorse taking the shape of regret after my folly in wasting my life in such a way – a man of superior talents and education. This terrible remorse turned me gray in one night, and whenever it came upon me I was perceptibly grayer the next morning. What I suffered in this way is beyond the expression of words. It was hell- fire in all its most dreadful tortures. Often did I vow that if I got over ‘this time’ I would reform. Alas, in about three days I fully recovered, and was as happy as ever. So it went on for years, but, with a physique like a rhinoceros, I always recovered, and as long as I let drink alone, no man was as capable of enjoying life as I was.

“I was converted in my own bedroom in my father’s rectory house at precisely three o’clock in the afternoon of a hot July day (July 13, 1886). I was in perfect health, having been off from the drink for nearly a month. I was in no way troubled about my soul. In fact, God was not in my thought that day. A young lady friend sent me a copy of Professor Drummond’s *Natural Law in the Spiritual World*, asking me my opinion of it as a literary work only. Being proud of my critical talents and wishing to enhance myself in my new friend’s esteem, I took the book to my bedroom for quiet, intending to give it a thorough study, and then write her what I thought of it. It was here that God met me face to face, and I shall never forget the meeting. “He that hath the Son hath life eternal, he that hath not the Son hath not life.” I had read this scores of times before, but this made all the difference. I was now in God’s presence and my attention was absolutely ‘soldered’ on to this verse, and I was not allowed to proceed with the book till I had fairly considered what these words really involved. Only then was I allowed to proceed, feeling all the while that there was another being in my bedroom, though not seen by me. The stillness was very marvelous, and I felt supremely happy. It was most unquestionably shown me, in one second of time, that I had never touched the Eternal: and that if I died then, I must inevitably be lost. I was undone. I knew it as well as I now know I am saved. The Spirit of God showed it me in ineffable love; there was no terror in it; I felt God’s love so powerfully upon me that only a mighty sorrow crept over me that I had lost all through my own folly; and what was I to do? What could I do? I did not repent even; God never asked me to repent. All I felt was ‘I am undone,’ and God cannot help it, although he loves me. No fault on the part of the Almighty. All the time I was supremely happy: I felt like a little child before his father. I had done wrong, but my Father did not scold, me, but loved me most wondrously. Still my doom was sealed. I was lost to a certainty, and being naturally of a brave disposition I did not quail under it, but deep sorrow for the past, mixed with regret for what I had lost, took hold upon me, and my soul thrilled within me to think it was all over. Then there crept in upon me so gently, so lovingly, so unmistakably, a way of escape and what was it after all? The old, old story over again, told in the simplest way: ‘There is no name under heaven whereby ye can be saved except that of the Lord Jesus Christ.’ No words were spoken to me; my soul seemed to see my Saviour in the spirit, and from that hour to this, nearly nine years now, there has never been in my life one doubt that the Lord Jesus Christ and God the Father both worked upon me that afternoon in July, both differently, and both in the most perfect love conceivable, and I rejoiced there and then in a conversion so astounding that the whole village heard of it in less than twenty-four hours.

“But a time of trouble was yet to come. The day after my conversion I went into the hay- field to lend a hand with the harvest, and not having made any promise to God to abstain or drink in moderation only, I took too much and came home drunk. My poor

sister was heart-broken; and I felt ashamed of myself and got to my bedroom at once, where she followed me, weeping copiously. She said I had been converted and fallen away instantly. But although I was quite full of drink (not muddled, however), I knew that God's work begun in me was not going to be wasted. About midday I made on my knees the first prayer before God for twenty years. I did not ask to be forgiven; I felt that was no good, for I would be sure to fall again. Well, what did I do? I committed myself to him in the profoundest belief that my individuality was going to be destroyed, that he would take all from me, and I was willing. In such a surrender lies the secret of a holy life.

"From that hour drink has had no terrors for me: I never touch it, never want it. The same thing occurred with my pipe: after being a regular smoker from my twelfth year the desire for it went at once, and has never returned. So with every known sin, the deliverance in each case being permanent and complete. I have had no temptation since conversion, God seemingly have shut out Satan from that course with me. He gets a free hand in other ways, but never on sins of the flesh. Since I gave up to God all ownership in my own life, he has guided me in a thousand ways, and has opened my path in a way almost incredible to those who do not enjoy the blessing of a truly surrendered life."

4. FROM THE AUTOBIOGRAPHY OF J. TREVOR (2002, p. 432)

"One brilliant Sunday morning, my wife and boys went to the Unitarian Chapel in Macclesfield. I felt it impossible to accompany them –as though to leave the sunshine on the hills and go down there to the chapel, would be for a time an act of spiritual suicide. And I felt such need for new inspiration and expansion in my life. So, very reluctantly and sadly, I left my wife and boy to go down into the town, while I went further up into the hills with my stick and my dog. In the loveliness of the morning, and the beauty of the hills and valleys, I soon lost my sense of sadness and regret. For nearly an hour I walked along the road to the 'Cat and Fiddle,' and then returned. On the way back, suddenly, without warning, I felt that I was in Heaven – an inward state of peace and joy and assurance indescribably intense, accompanied with a sense of being bathed in a warm glow of light, as though the external condition had brought about the internal effect – a feeling of having passed beyond the body, though the scene around me stood out more clearly and as if nearer to me than before, by reason of the illumination in the midst of which I seemed to be placed. This deep emotion lasted, though with decreasing strength, until I reached home, and for some time after, only gradually passing away."

5. DR. R. M. BUCKE (originator of the term "cosmic consciousness," (2002 p. 435)

"I had spent the evening in a great city, with two friends, reading and discussing poetry and philosophy. We parted at midnight. I had a long drive in a hansom to my lodging. My mind, deeply under the influence of the ideas, images, and emotions called up by the reading and talk, was calm and peaceful. I was in a state of quiet, almost passive enjoyment, not actually thinking, but letting ideas, images, and emotions flow of themselves, as it were, through my mind. All at once, without warning of any kind, I found myself wrapped in a flame-colored cloud. For an instant I thought of fire, an immense conflagration somewhere close by in that great city; the next, I know that the fire was within myself. Directly afterward there came upon me a sense of exultation, of

immense joyousness accompanied or immediately followed by an intellectual illumination impossible to describe. Among other things, I did not merely come to believe, but I saw that the universe is not composed of dead matter, but is, on the contrary, a living Presence; I became conscious in myself of eternal life. It was not a conviction that I would have eternal life, but a consciousness that I possessed eternal life then; I saw that all men are immortal; that the cosmic order is such that without any peradventure all things work together for the good of each and all; that the foundation principle of the world, of all the worlds, is what we call love, and that the happiness of each and all is in the long run absolutely certain. The vision lasted a few seconds and was gone; but the memory of it and the sense of the reality of what it taught has remained during the quarter of a century which has since elapsed. I knew that what the vision showed was true. I had attained to a point of view from which I saw that it must be true. That view, that conviction, I may say that consciousness, has never, even during periods of the deepest depression, been lost.”

Section 4: A summary of the content of VRE

In Lecture I: “Religion and Neurology,” WJ establishes that Varieties of Religious Experience is a descriptive study of the peculiar capacity of human beings to have transformative religious experiences. WJ chooses to present descriptions as they are found in religious and secular literature of the people he calls religious “geniuses.” These individuals are extreme examples of a normally distributed human capacity, and he notes that it is in the extreme examples that we can learn the most about any phenomenon. He acknowledges that religious experience may make an individual appear eccentric and in many cases the religious experiences described have elements of mental disorder. “Medical materialism” and “medical materialists” are terms he introduces to describe those individuals who would dismiss religious experience because of its connection to mental disorder or other stigmatized conditions. WJ is adamant that such a critique is invalid. He notes that the evaluation of religious experience should be based on the consequences, the fruits, the results of religious experience in the life of the individual who has the experience and the subsequent effect on the culture in which the individual lives. He describes this as the “empiricist criterion,” evaluation of an experience by its consequences, not by its roots or antecedents. In this process he is introducing us to pragmatism, a uniquely American philosophical point of view that WJ championed and which remains a strong philosophic perspective today. How something works “on the whole” is how WJ will evaluate the value of a thought, concept, or behavior.

Lecture I: “Religion and Neurology” Main Points

1. Humans have an aptitude or ability to have religious experiences, and thus to dramatically transform themselves. This characteristic is normally distributed.
2. “Medical materialism” or reductionism is an inadequate frame of reference for understanding these transformations.
3. The consequences - the fruits - of these experiences, “how they work on the whole,” is the most valid way to evaluate them.

In Lecture II: “Circumscription of the Topic,” WJ establishes that his subject in these lectures is personal religious experience, not institutional religion. It is the experience, for example, of the founders of religious institutions and not the followers, or the bureaucrats. He offers the following description of his topic: “...the feelings, acts, and

experiences of individual men in their solitude, so far as they apprehend themselves to stand in relation to whatever they may consider the divine. (2002 p. 36)” In circumscribing his topic WJ begins an emphasis that occurs throughout these lectures: that religious experience is distinguished by marked feeling, by intense affect, by significant emotion. Generally the emotions involved are joyous - or - ecstatic, but serious and solemn as well. Further, the religious experience comes unbidden. It does not generally involve will or effort and adds power to the individual’s life, the power to do things seemingly impossible. It also releases the individual from worldly demands and leads them to welcome and embrace pain and suffering as essentially meaningless.

Lecture II: “Circumscription of the Topic” Main Points

1. Religious experience, what A.A. would call spiritual experience, is the personal experience of individuals encountering the/a higher power(s).
2. The religious experience is characterized by intense emotion.
3. The religious experience does not involve the human will; it comes unbidden. The individual feels passive, acted upon.
4. The religious experience gives the individual “power” to accomplish seemingly impossible things.

In Lecture III: “The Reality of the Unseen,” WJ notes that the broadest characterization of religious life is that “there is an unseen order and that our greatest good lies in harmoniously adjusting ourselves to this order. (2002, p.61)” Further, WJ notes that belief in, and response to, abstract ideas (‘objects of our consciousness’) uniquely characterizes humans and is often more powerful than response to concepts that emerge from sensory experience. These abstract cognitions often appear to have no empirical (sensory) reality. WJ sees this response to unseen things, to felt “presences,” as a special “sense” that probably has a neurophysiological locus, similar to vision, hearing, taste, etc. In some cases the power of these abstract concepts is so great that individuals actual “feel” or sense their presence, and sometimes experience them in what we would describe as full- blown hallucinatory experiences. Finally, rational or intellectual argument cannot undercut such experiences, as they often have the quality of authoritative disclosure to the individual who has the experience.

[...]

Main Points of Chapter 2: “The Spiritual Solution.”

1. Alcoholism is a hopeless illness marked by loss of control and obsession with the first drink.
2. There is healing power in one alcoholic talking to another.
3. Because of the unique insanity before the first drink, the alcoholic is beyond human aid.
4. The solution to the situation of the alcoholic involves deep and effective and ongoing spiritual experiences.
5. Carl Jung, but particularly William James in *IRE*, support the need for spiritual experience and document the multitude of ways men discover their individual conception of God.

Chapter Three “More About Alcoholism” describes the delusion that the alcoholic is like non-alcoholics, who can use alcohol in safety. The life of an alcoholic is “characterized by countless vain attempts to prove we could drink like other people. (2001, p. 30)” Thus

conceding “to our innermost selves that we were alcoholics. (2001, p. 30)” is the first step in the recovery process. The loss of control of alcohol use is the central and irreversible feature of the disease. There is a discussion in this chapter of the mental states that precede the first drink in an alcoholic and an appreciation of these states as forms of subtle “insanity” that do not yield to will power, or self-knowledge. Numerous anecdotal examples make this point. The authors conclude that their experience discloses that only a spiritual answer will suffice, that apart from divine help the alcoholic is hopeless.

[...]

The Twelve Steps

1. We admitted that we were powerless over alcohol-- that our lives had become unmanageable.

2. Came to believe that a Power greater than ourselves could restore us to sanity.
3. Made a decision to turn our will and our lives over to the care of God as we understood Him.
4. Made a searching and fearless moral inventory of ourselves.
5. Admitted to God, to ourselves, and to another human being the exact nature of our wrongs.
6. Were entirely ready to have God remove all these defects of character.
7. Humbly asked Him to remove our shortcomings.
8. Made a list of all persons we had harmed, and became willing to make amends to them all.
9. Made direct amends to such people wherever possible, except when to do so would injure them or others.
10. Continued to take personal inventory and when we were wrong promptly admitted it.
11. Sought through prayer and meditation to improve our conscious contact with God as we understood Him, praying only for knowledge of His will for us and the power to carry that out.
12. Having had a spiritual awakening as the result of these steps, we tried to carry the message to alcoholics, and to practice these principles in all our affairs.

It is worth noting that the essential difference between the specific practices recommended to the alcoholic by the 12-steps of A. A., and any other program of spiritual development is the specific, repeated acknowledgement of powerlessness over a specific psychoactive substance, (i.e., alcohol.) Except for offshoots from A.A., such as Narcotics Anonymous (N.A.), there is no other program of spiritual development that begins with the rejection of a psychoactive substance and continuously focuses on the rejection of that substance for the lifetime of the individual. One could argue that this specific, implacable focus on and rejection of the drug alcohol, coupled with the program’s delivery of recovery principles to one sick alcoholic by another less sick alcoholic, represent two of the several innovative aspects of A.A. practice.

This chapter, in addition to introducing the A.A. Twelve Steps for the first time in print, discusses how to practice the first four steps. Assuming the alcoholic has accepted their alcoholism, their powerlessness, and their need for a Higher Power, the chapter moves to the pivotal third step requirement of overcoming self-will, self-centeredness,

and egocentricity. It introduces prayer and in particular one specific prayer (2001, p.63) to help in this task. With this in mind the “personal housecleaning” of step four begins as an action -oriented, strenuous effort to remove barriers to experience of a Higher Power through abnegation of self. A specific, simple, written method is outlined, for identifying the “common manifestations” of self. “Resentments” considered the “number one” manifestation of self is dealt with in some detail.

Main Points in Chapter 5 “How it Works”

1. The specific practices outlined in the Twelve Steps are introduced.
2. While not an unusual program of spiritual development, it is the only one known that specifies a desire to stop using a psychoactive substance as the first step of practice and is presented only by individuals with alcoholism to other individuals w alcoholism.
3. How to “work” the first four steps is presented in this chapter.

Chapter Six: “Into Action” promotes confession of the personal inventory (Step 5) to a carefully selected person, usually a member of a religious community or one’s “sponsor” (i.e. an A.A. mentor). The process of the fifth step may, Alcoholics Anonymous contends, produce a “spiritual experience” that leads to the feeling that “the drinking problem has disappeared.” A meditation is proposed subsequent to this step (2001, bottom p. 75) prior to proceeding to the “readiness” sixth step. Another prayer completes the seventh step (2001, p.76). Steps eight and nine require more written action, a list of all persons harmed through one’s alcoholism, and then – if possible - personal contact, communication, and reparations to persons harmed. Making amends is considered to be part of the healing spiritual experience so necessary to recovery. These action steps remind the alcoholic “to go to any lengths to find a spiritual experience... (2001, p. 79).” Furthermore, the A.A. member is enjoined: “The spiritual life is not a theory. We have to live it. (2001, p. 83),” emphasizing the distinction between thinking and doing. The ninth step concludes with Promises, described in a paragraph (2001, p. 83 ff). The Promises are frequently read at A.A. meetings and represent the remarkable outcomes expected of this step process. Step ten advises the alcoholic to continue, “to take personal inventory and when we were wrong promptly admitted it.” That combined with the previous actions, leads us to “the world of the spirit” and strongly urges the daily, repetitive practice of this “way of living.” Without this daily practice the text tells the alcoholic that they are vulnerable to returning to alcohol use. (“What we really have is a daily reprieve contingent on the maintenance of our spiritual condition. (p. 85)”) The text also notes that if we have “carefully followed directions” we have begun to have a “sixth sense” detecting the flow of the “Spirit” into ourselves. The chapter ends with a call to action (“Faith without works is dead.”) and a discussion of how to pray and meditate and what to pray and meditate about. The key to prayer is: “Thy will be done.”

Main Points of Chapter 6: “Into Action.”

1. This chapter, in discussing steps 5-11, emphasizes action, the distinction between thinking and doing, and actually “living” the Step program.
2. A set of super-normal behaviors, thought to begin to be demonstrated in recovering alcoholics lives after the completion of step nine, called the Promises are described.

3. The step practices described are conceived of as daily and repetitive.
4. A “sixth sense” is described as emerging that allows the recovering alcoholic to detect the presence of Spiritual or Higher Power into the self.
5. There is a very practical description of what is meant by prayer and meditation.
6. The pragmatic criteria is underscored: “It works.”

[...]

Bill notes in another citation of James (1957, p. 160) that the basic ideas for the initial A.A. program came from the Oxford Groups, William James, and Dr. William Duncan Silkworth. It “boiled down” to six steps:

1. We admitted that we were licked, that we were powerless over alcohol.
2. We made a moral inventory of our defects or sins.
3. We confessed or shared our shortcomings with another person in confidence.
4. We made restitution to all those we had harmed by our drinking.
5. We tried to help other alcoholics, with no thought of reward in money or prestige.
6. We prayed to whatever God we thought there was for power to practice these

precepts.

The next citation in *Alcoholics Anonymous Comes of Age* is from a dinner talk by Dr. Samuel Shoemaker, an Episcopal clergy member and great supporter of A.A.: “I take it that it began to be quite clear quite early in the life of A.A. that Dr. Jung’s simple declaration that science had no answer, and Dr. Silkworth’s incalculable help from the medical side and William James’ great wisdom in his *Varieties of Religious Experience*, still left the need for a spiritual factor that would create a kind of synthesis and offer a kind of positive dynamic. The problem was: How to translate the spiritual experience into universal terms without letting it evaporate into mere ideals and generalities. And so, immediately after Step One, which concerned the unmanageability of life, came Step Two: We came to believe in a power greater than ourselves that could restore us to sanity. The basis of that belief was not theoretical; it was evidential. Right before us were people in whose lives were the beginnings of a spiritual transformation. You could question the interpretation of the experience, but you couldn’t question the experience itself. (1957, p. 262)” Dr. Shoemaker continues a couple of pages later, “William James, in the famous passage in *Varieties of Religious Experience*, says this: The crisis of self surrender is the throwing of our conscious selves on the mercy of powers which, whatever they may be, are more ideal than we are actually, and make for our redemption. Self-surrender has been and always must be regarded as the vital turning point of the religious life. (1957, p. 265)” Here are two ideas deeply embedded in A.A. First, A.A. constantly asks the newcomer to observe the evidence presented in the life and stories of recovering people: “We were just like you,” A.A. says to the newcomer, “and by doing the things A.A. suggests, we have changed. You can too.” Second, there is in A.A. the paradox often commented on by new members, “First you tell me to ‘Hang on!’ to follow you recovering people around, to work the A.A. program and then you tell me to ‘Let go and let God, you tell me to hang on until the miracle happens, so which is it?”

Finally, from *Alcoholics Anonymous Comes of Age* there is this quote from a book review of the first edition by Dr. Harry Emerson Fosdick: “By religion they mean an experience which they personally know and which has saved them from slavery, when psychiatry and medicine had failed. They agree that each man must have his own way of

conceiving of God, but of God Himself they are utterly sure, and their stories of victory in consequence are a notable addition to William James' *Varieties of Religious Experience*. (1957, p. 323)" Here we have again an emphasis on the fact that the members of A.A. that the newcomer meets have the experience of illness and recovery. As Dr. Bob Smith said about his meeting with Bill Wilson, "Of far more importance was the fact that he was the first living human with whom I had ever talked, who knew what he was talking about in regard to alcoholism from actual experience. In other words, he talked my language. (2001, p. 180)" The connection here was not intellectual, not some authority diagnosing or pronouncing. It was emotional, personal, subjective, just what William James concluded about the nature of religious experience. Again we have a sense of openness to whatever conception of God, to whatever Power greater than the self, that the newcomer might accept.

In the collection of Bill Wilson's writings for the A.A. Grapevine, the international journal of A.A., entitled *The Language of the Heart* (1988), the reader can find further references to William James and VRE that reiterate and somewhat expand the points made above. Bill, for example, is reminded again by Dr. Silkworth that "truly transformative spiritual experiences are nearly always founded on calamity and collapse, that he should stop preaching and give the alcoholic the "hard medical facts" first. "This may soften them up so they will be willing to do anything to get well. Then they may accept those moral psychology ideas of yours, and even a Higher Power. (1988, p. 176)"

In another chapter "A Fragment of History: Origin of the Twelve Steps," he cites James as follows: "Not only, he (James) said, could spiritual experiences make people saner, they could transform men and women so that they could do, feel, and believe what had hitherto been impossible to them. It mattered little whether the awakenings were sudden or gradual, their variety could be almost infinite. But the biggest payoff of that noted book (VRE) was this: In most of the cases described, those who had been transformed were hopeless people. In some controlling area of their lives they had met absolute defeat. Well, that was me all right. In complete defeat, with no hope or faith whatever, I had made an appeal to a Higher Power. I had taken Step One of today's A/A. program—"Admitted we were powerless over alcohol, that our lives had become unmanageable." I'd also taken Step Three—"Made a decision to turn our will and our lives over to the care of God as we understood him." Thus was I set free. It was just as simple, yet just as mysterious, as that. (1988, p. 197 ff)"

This "deflation at depth" which Bill believed William James emphasized in VRE was very important (1988, p. 199, 279). Finally, in "The Language of the Heart," Bill emphasizes that the utter necessity for the spiritual awakening, indicated in the Twelfth Step by the words "Having had a spiritual awakening..." Bill says this was a life-giving idea transmitted from James' VRE (1988, 297 ff) to A.A.

William James' authoritative work validated Bill Wilson's spiritual experience, distinguished the experience from psychopathology, documented previous cases of recovery from alcoholism, and focused attention on the transformational nature of such experiences. James' understanding of the need of different "types" of people for different spiritual approaches and his general catholicity contributed to A.A.s open tolerant approach to spiritual matters. James lent support to Dr. Silkworth's suggestion that the focus on the hopelessness of alcoholism could help the suffering alcoholic move beyond the conscious, striving self. In this deflation of the ego was the "letting go" that would allow the entrance of "power" to do what had been previously impossible. In this process James emphasized emotion as a vital element that transcended the intellect in this arena.

James also gave support to the value of personal experience and “action,” versus thought or analysis. Finally, James contributed the central idea that it was the consequences, “what works on the whole,” that was the definitive criteria for evaluating this new program. In a very real sense, A.A. represents a condensation of the ideas in VRE and “It should come as no surprise, then, that Bill Wilson the founder of Alcoholics Anonymous, which is often cited as the most successful alcohol treatment program ever designed, once wrote a letter to Carl Jung explaining his indebtedness to James’ *Varieties of Religious Experience* and saying that in founding A.A. he has done little more than make ‘conversion experiences—nearly ever variety reported by James—available on an almost wholesale basis’ (2006, p. 405).”

References

- Anonymous (1952) *Twelve Steps and Twelve Traditions*. New York: Alcoholic Anonymous World Services, Inc.
- Anonymous (1957) *Alcoholics Anonymous Comes of Age*. New York: Alcoholics Anonymous World Services, Inc.
- Anonymous. (2001) *Alcoholics Anonymous*. New York: Alcoholics Anonymous World Services, Inc.
- Bridgers, L. (2005) *Contemporary Varieties of Religious Experience*. Lanham MD: Lanham, Rowman and Littlefield Publishers.
- James, W. (2002) *The Varieties of Religious Experience: A Study in Human Nature*. New York: Modern Library.
- Richardson, R.D. (2006) *William James: In the Maelstrom of American Modernism*. Boston, New York: Houghton Mifflin.
- Robertson, N. (1988) *Getting Better: Inside Alcoholics Anonymous*. New York: William Morrow
- Taylor, C. (2002) *Varieties of Religion Today: William James Revisited*. Cambridge, MA: Harvard University Press.
- Wilson, W.G. (1988) *The Language of the Heart*. New York: The A.A. Grapevine, Inc.

Originally published online by the Dublin Group, Inc. at: <http://dubgrp.com/content/william-james-bill-wilson-and-development-alcoholics-anonymous-aa>

Overcoming Societal Addictions: What Can We Learn From Individual Therapies?

by Robert Costanza, Paul W.B. Atkins, Mitzi Bolton, Steve Cork, Nicola J. Grigg, Tim Kasser, and Ida Kubiszewski

Abstract

Societies, like individuals, can get trapped in patterns of behavior called social traps or “societal addictions” that provide short-term rewards but are detrimental and unsustainable in the long run. Examples include our societal addiction to inequitable over-consumption fueled by fossil energy and a “growth at all costs” economic model. This paper explores the potential to learn from successful therapies at the individual level. In particular, Motivational Interviewing (MI) is one of the most effective therapies. It is based on engaging addicts in a positive discussion of their goals, motives, and futures. We suggest that one analogy to MI at the societal level is a modified version of scenario planning (SP) that has been extended to engage the entire community (CSP) in thinking about goals and alternative futures via public opinion surveys and forums. Both MI and CSP are about exploring alternative futures in positive, non-confrontational ways and building commitment or consensus about preferred futures. We conclude that effective therapies for societal addictions may be possible, but, as we learn from MI, they will require a rebalancing of effort away from only pointing out the dire consequences of current behavior (without denying those consequences) and toward building a shared vision of a positive future and the means to get there.

1. Introduction

The need for human society to rapidly deal with climate change, limit population and material consumption growth, transition to a renewable energy path, distribute wealth more equitably, and deal with a host of other interrelated problems is widely accepted in the scientific community and, increasingly, in the policy community (Costanza *et al.*, 2014). However, movement in this direction has been slow. To many, this lack of movement is hard to understand. Given the increasingly obvious warning signs, why has society still not taken appropriate action and changed its behavior accordingly?

In this paper, we draw the analogy between defensive denial at the society level and defensive denial from drug or alcohol addicts when warned about the long-run implications of their behavior. It is well known in addiction therapy that it is rarely effective to directly confront addicts concerning the damage they are causing to themselves and others. Rather than motivating addicts to change, such interventions often result in a reactive denial on the part of the addict and lack of progress toward overcoming the addiction. Yet, such a confrontational approach is typical of the strategies used by scientists and activists who try to effect change at the societal level regarding climate change, overconsumption, overpopulation, inequality, and many other issues.

From a psychological perspective, then, the lack of progress in ameliorating these issues is to be expected as long as these topics continue to be approached in a mainly confrontational, judgmental way. Like with individual addictions, taking a less confrontational approach does not deny the reality of the dire consequences. It merely recognizes that knowledge and communication of those dire consequences is often not enough to motivate change, and can even have the effect of prolonging the destructive behavior. Perhaps more progress would be made with a different way of framing and discussing the issues that is more analogous with the practices that help people overcome individual addictions.

We first define addiction at the individual level and then explore how entire societies might also be thought of as addicted to specific modes of behavior. We then consider some of the characteristics of therapeutic approaches that have been successful for treating addictions at the individual level. We concentrate on one particular approach (motivational interviewing or MI) since this approach seems especially successful at the individual level and amenable to scaling up to the societal level. However, we acknowledge that a range of approaches may be brought to bear on this problem. Finally, we propose an approach to societal therapy for problems facing contemporary society and conclude with suggestions for how this approach might be facilitated.

2. What Is Addiction?

Addiction is typically understood as encompassing several features (American Psychiatric Association, 2013; Sussman and Sussman, 2011). For example, the most recent edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-V)* specifies that people suffering from substance-use disorders often experience a lack of control (manifest in cravings and in failed attempts to quit or regulate intake of the substance), negative consequences (such as problems in work and relationships), and a failure to quit using the substance despite negative consequences (like physical and psychological problems). Addiction to drugs (and apparently to gambling as well) occurs because short-term rewards provided by the ingestion of the substance have become so powerful and enticing that an addict's life becomes increasingly oriented around the substance, such that other, healthier behaviors diminish in frequency and substance use behavior persists even in the face of (sometimes dire) negative consequences.

3. How Can a Society Be Thought of as 'Addicted'?

Unfortunately, many 21st century social institutions and incentive structures parallel those found in addicted individuals, in that short-term rewards are sometimes so powerful that other, more adaptive actions are diminished and damaging activities continue despite evidence of longer-term negative consequences. Individuals (or firms or communities or countries) pursuing their own narrow self-interests in the absence of mechanisms that account for community and global interests frequently run afoul of these more adaptive long-term goals and can often drive themselves, and the communities of which they are a part, to less desirable ends.

The inconsistencies of these short-term rewarding goals for individuals and incentives with long-term adaptation for the community have been described many times before. Perhaps the most often cited is Hardin's (1968) classic paper on the tragedy of the commons (more accurately, the tragedy of open-access resources) and continuing through

work on “social traps” (Beddow *et al.*, 2009; Carpenter and Brock, 2008; Costanza, 1987; Cross and Guyer, 1980; Platt, 1973). Social traps occur when local or individual incentives that guide individual behavior are inconsistent with the overall goals of the society or system. Cigarette and drug addiction are parallel examples at the individual level. As has been noted, addicts often know full well the harmful effects of their substance use but they nonetheless continue to use the drug. Similar examples at the societal level include: Overuse of pesticides, fetishization of economic growth, overconsumption, privatization of information, fossil fuel consumption leading to climate change, and overfishing. In the example of overfishing in an open-access fishery, by following the short-run economic incentives, fishers are led to exploit the resource to the point of collapse. Because social traps are essentially societal addictions, providing immediate gratification accompanied by hurdles to sufficient regard for future costs, we will use the terms interchangeably in what follows.

Social traps, or addictions, are also amenable to experimental research on how individuals behave in trap-like situations and how to avoid and escape these traps (Brockner and Rubin, 1985; Costanza and Shrum, 1988; Edney and Harper, 1978; Rothstein and Uslaner, 2005). The bottom line is that, in cases where social traps exist, the system is not inherently sustainable and special steps must be taken to harmonize goals and incentives between local, national, and global scales, and between individual and community scales. In economic jargon, private costs and benefits must reflect social costs and benefits. Local and short-term goals must be made incumbent on and consistent with global and long-term goals and incentives.

It is worth pointing out that most of this research has been about how individuals respond to entrapping incentives, rules and norms. In essence, to remove the trap, one has to change the rules and incentives that set the trap in the first place. In this paper we are concerned with how societies can go about changing these entrapping rules and incentives, rather than changing individual behaviors in spite of the entrapping rules and incentives.

It is also true that it is not easy to predict individual behavior in response to different societal incentive structures from simple “rational” models of human behavior prevalent in conventional economic thinking. The experimental facts indicate the need to develop more realistic models of human behavior under uncertainty, acknowledging the complexity of real-world decisions and our species’ limited information processing capabilities (Heiner, 1983; Kahneman, 2011). The limitations of the current economic approach have been recognised by some economists, and there is growing academic and government interest in behavioral and experimental economics approaches that seek to understand how people actually behave, rather than how an idealized “rational” individual should behave (Ariely, 2009; Low, 2012; Lunn, 2014; Courtney *et al.*, 2014).

What has not been adequately addressed in the social trap or behavioral economics literatures is the question of the methods that can be most effective for escaping these traps. “Traps” are obviously best avoided, and strategies that help avoid traps and prevent addictions are preferred. But little has been done to design effective escapes or “therapies” once the societal trap has been entered. Fortunately, much has been done to help individuals escape their own traps or addictions. We now turn to a discussion of one of the most effective of these therapies before discussing how to apply these results at the societal level.

4. Therapies that Work to Treat Addiction at the Individual Level

One of the most successful treatments for addictions is motivational interviewing (MI; Miller and Rollnick, 2012). Unlike many other forms of therapy, MI is rated by Division 12 (The Society for Clinical Psychology) of the American Psychological Association as having strong research support for mixed addictions (see <http://www.div12.org/psychological-treatments/disorders/mixed-substance-abusedependence/>). MI is a therapeutic approach designed as a collaborative conversation aimed at strengthening the client's motivation for change. We focus here on MI because it is explicitly designed to increase motivation for change in situations where people are ambivalent about changing. A comprehensive definition of MI offered by Miller and Rollnick (2012) is:

“Motivational interviewing is a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion.”

MI is a technique that helps clients to explore and resolve sources of ambivalence regarding change and to build intrinsic motivation to change. MI draws from a client-centered tradition (a la Rogers, 1951, 1961), meaning that it is based on principles of warmth, empathy and an egalitarian relationship between therapist and client that involves reflective listening and questioning. That said, MI is also somewhat directive in that the therapist contributes to identifying workable goals for treatment and to suggesting effective techniques for behavioral change.

MI was first developed in response to Miller's findings in some of his studies that the best predictor of positive therapeutic outcomes was not the form of treatment per se but the degree of empathy of the therapist. This finding has now been replicated many times and demonstrates that a key element of effective therapy is the “therapeutic alliance” between the therapist and the client.

Miller and Rollnick (2012) propose four key processes underpinning motivational interviewing:

1. *Engaging* is about creating a working alliance between the therapist and client. It necessarily involves building trust and reciprocity. Engaging is the process of establishing a helpful connection and working relationship.

2. *Focusing* is about setting an agenda for the engagement. While for some clients, it may be premature to plan specific goals (see below), the focusing phase is about helping clients identify their own broad agenda for change in the context of the therapist's expertise. For example, if the therapist thinks that a particular goal is either inappropriate or excessively ambitious, the therapist might express that view. Client and therapist may bring different agendas, but if MI is to work, it is essential that clients are given the freedom to speak about the need for change in their own words and on their own time-frame.

3. *Evoking* is the core of motivational interviewing—it is where the therapist works with clients to help elicit their own motivation for change. The goal in this process is to watch for and support statements by the client suggesting a desire to change. Evocation refers to an implicit assumption in MI that working with a client's strengths and resources will be more useful than diagnosing deficits: clients already have much of what they need to change, and the task of the therapist is to evoke those change processes. This is a very different approach from a therapist who assumes a knowledge deficit in the client and seeks to fill that knowledge gap.

4. *Planning* is about both increasing clients' level of commitment to change and the development of a specific, concrete plan of action for making actual changes.

Some key elements of MI relevant to the current paper include:

1. **MI targets and reinforces 'change talk,'** where clients spontaneously offer up change-oriented statements, such as reasons or strategies for change.

2. **MI supports the client's own autonomy and choice.** While MI therapists can contribute their own perspectives, ultimately clients must be supported in coming to a place where they themselves wish to change behavior. Like many other therapies, MI relies upon the principle that engaging in a dialogue, not "telling," is essential to evoke change. Practically, MI enacts this principle and supports clients' autonomy via five key communication skills: asking open questions, affirming, reflecting, summarizing, and providing information and advice with permission.

3. **The essential spirit of MI is partnership.** Ambivalence is a normal part of preparing for change, but it is also a position where a person can remain stuck for some time. When therapists use a directing style rather than a partnership style, and when they argue for change with a person who is ambivalent about changing, the typical result is that the ambivalent person will deny the need to change and argue against changing. People are more likely to be persuaded by what they hear themselves say than by what their friends, loved ones, or therapists argue for. MI recognizes this and therefore tries to encourage the client to make change statements in the context of a dialogue between equals.

4. **MI is strengths and values focused.** Ultimately MI aims to appeal to people's deepest needs. MI is about setting goals to increase the likelihood of something positive happening rather than to decrease the likelihood of something negative occurring. This is crucial for addictions, since a good deal of addictive behavior is motivated by seeking to avoid unpleasant experience. For example, a person may drink in order to diminish the pain of conflict with a loved one or feelings of inadequacy. MI seeks to help people feel able (or self-efficacious) to engage in approach-oriented behavior. It does this, in part, by trying to foster a capacity to be in the presence of difficult experiences and not engage in a quick fix (i.e., the addictive behavior), but rather to help the person move in the direction of his/her own long term values and goals (i.e., psychological flexibility). Such solutions involve: a) not engaging in the addictive behavior; and b) engaging in some alternative, more satisfying (values-wise) behavior. Such a solution stands in contrast to the life-limiting ways that people often react to pain, such as by withdrawal or denial (i.e., experiential avoidance), reactions that typically limit the possibilities for positive change.

Other therapies, such as Acceptance and Commitment Therapy (ACT) make the issue of experiential avoidance even more central. ACT is similar to MI in that it is values-focused but it has a particular emphasis on developing acceptance and mindfulness in the presence of difficult experiences that may be encountered during change. Such mindfulness may be critical for changes that require some discomfort or some uncertainty as change occurs. The societal changes we need certainly fit into this category. There is good evidence that ACT is also effective in reducing addictive behavior (Hayes *et al.*, 2004; Lanza *et al.*, 2014; Smout *et al.*, 2010).

5. Therapists must embody and express acceptance and compassion: Dialogue needs to be non-judgmental. Making people feel badly about themselves or punishing them is rarely effective for motivating change; when it is effective, it is rarely effective for long, as these types of approaches simply lead to either momentary compliance or to reactance and resistance to change. For example, victim impact processes where offenders are forced to see the harm they have caused are surprisingly ineffective, having, in some cases, been associated with increased offending (Wheeler *et al.*, 2002). Acceptance does not mean that the therapist necessarily agrees with or approves of a client's choices, but Miller and Rollnick (2012) highlight the importance of interacting with clients in ways that recognize their worth, empathise with their perspective, support their autonomy and affirm their strengths and endeavors.

To get a better idea of the fundamental differences between the confrontational and the MI approach we direct the reader to these two YouTube videos, which show application of the two approaches to helping someone feel motivated to quit smoking:

Confrontational approach: <https://www.youtube.com/watch?v=80XyNE89eCs>

MI approach: <https://www.youtube.com/watch?v=URiKA7CKtfc>

5. Scaling up from the Individual to the Societal Level

How might the principles behind MI scale up to a societal level? Societies certainly seem ambivalent about changing their current behaviors that result in climate change, etc., even though the scientific consensus is that change is imperative if humanity is to avoid massive problems in the future. However, confronting society with this problem directly, as the scientific and activist communities have often done thus far, does not appear to have been an effective intervention—instead, it seems to have often evoked denial and resistance. Drawing on the MI metaphor, we propose that it would be more effective to engage society in positive change talk in empathic and supportive ways, focus on shared goals, evoke and motivate positive change, and plan effective pathways to change.

Of course, for this metaphor to be apt, one must ask “Who is the addict and who is the therapist?” Society is more than just the sum of individuals, and there are many distinct sub-groups, interest groups, and behavioral outliers within it. Some of these groups are more ambivalent about change than others. Probably the closest analogy is that the scientific and activist communities play the role of therapist, able to take a more detached view of the implications of current behavior for the future. Just as an MD would not support a client's goal to continue smoking given the overwhelming evidence of the health costs down the road, there is an overwhelming amount of scientific evidence that

changes in societal behavior are needed. But, as the two YouTube videos mentioned above clearly show, how this information is conveyed can make a huge difference in whether the people feel motivated to change their behaviors. Part of the problem may be that the scientific and activist communities have not been employing an effective therapy to encourage positive change, leading in some cases to a breakdown of trust with other parts of society. But there is no way to step around the idea that change is needed, and something more analogous to MI might be more effective.

6. A Few Examples at the Societal Scale

Here we note a few selected historical examples of societal therapies that did work and point out the features of these examples that mirror the MI approach.

6.1. Gandhi and Overcoming Colonialism

Rather than confront British colonialism in India directly via an armed rebellion, Gandhi famously employed “passive, non-violent resistance.” Gandhi was able to mobilize a large segment of the population around a shared positive vision of an independent India. He also realized that reforms within the British system would never be enough. Like an addict who realizes that “cutting back” will never work, Gandhi knew that a major transformation of the system was necessary. He facilitated a shared vision of the goal (an independent India), broad civic engagement and support, clear tactics, and a positive framing of the intended result. As can be expected with any therapy to a recalcitrant addiction, success did not come overnight, but it did eventually come.

6.2. Emancipation and the Civil Rights Movement

Slavery had become ingrained in the economic systems of several New World countries, notably the US South. The South was in a very real sense “addicted” to slavery, and all the rules, norms, institutions and culture surrounding and supporting it. Breaking out of that pattern required a civil war – not the best or most effective kind of therapy. In addition, the addiction to “slavery” did not end with emancipation. The institutions of slavery persisted under different names with the continued segregation of blacks and their relegation to second-class citizen status, and the denial of full voting and other rights. It was not until the Civil Rights movement of the 1960s that the full rights of black Americans were restored. This movement was analogous to MI in its use of empathy, engagement, non-violence, and a focus on positive change with clear goals. Martin Luther King’s famous “I have a dream” speech articulated those goals in a very compelling way. The process was certainly not painless, but the Civil Rights movement ultimately succeeded in achieving the majority of its goals.

6.3. Cigarette Smoking

Rates of smoking have declined from over 50% of men and 34% of women in 1965, to just 23.5% of men and 17.9% of women in 2010 (CDC, 2011). Biglan (2015) argues that “the tobacco control movement is probably the most significant science-driven behavioral change our culture has ever seen”. A major element of the success of this change was the fact that smoking is clearly measurable and obviously harmful. This meant that goals for change could be clearly stated, and effectiveness of interventions could be easily assessed against the clear and simple goal of reducing rates of smoking.

Other key elements of the tobacco control movement included public advocacy, good science (e.g., epidemiology identifying incidence and prevalence), good ongoing

measurement and reporting, and excellent programs, policies and practices designed to both educate and make smoking less attractive than alternatives. In summarizing the effectiveness of these interventions, Biglan (2015), a noted expert in the tobacco control movement, argued: “I have to confess that policies, public advocacy, and education have been far more important than programs in reducing smoking.” This provides an interesting counterpoint to the other examples of social change mentioned in this article and the problem of reducing societal addiction to consumption. Unlike these more complex situations, smoking is an example where the goals are exceedingly clear, the behavior is directly under human control, most of the people engaged in the behavior are intrinsically motivated to want to change (most smokers would prefer not to be smokers), there is strong empathy for smokers (generally speaking) and there is clear and agreed-upon evidence for the need to change. Despite this, it still took fifty years for smoking rates to halve in the face of tobacco companies seeking to lobby governments and muddy the waters of scientific evidence. Advocacy, policies and education can work but in the face of determined opposition, it can take a long time.

7. Therapies That Might Work at the Societal Level

To review, MI suggests that there are four basic principles that underlie successful therapies. Applied to a societal context, these basic MI principles could be summarized as:

1. **Engaging:** building relationships with diverse stakeholders to encourage change talk
2. **Focusing:** setting shared goals among those stakeholders
3. **Evoking:** helping stakeholders identify motivations for positive change
4. **Planning:** helping stakeholders move from goals to actual change

How might these ideas be applied to whole communities and societies to enable them to engage in thinking about their goals and alternative futures in a way that will allow positive change? Next we discuss in detail one example of a process that may be a good analog to MI at the societal level. We do not wish to imply that this is the only possible approach to societal therapy. There are a range of methodologies employed in fields like participatory action research and participatory planning that could be brought to bear. We mention some of these further on.

7.1. Community Scenario Planning

Scenario planning (SP) is one technique that could be used at larger community, national, and even global levels to discuss goals, motives, and futures. Scenario planning provides an opportunity to discuss and develop consensus about what social groups want (Peterson *et al.*, 2003). Accurately predicting the future is difficult, if not impossible, for complex socio-ecological systems due to the number of interacting and irreducible uncertainties involved. What people can do is to lay out a series of plausible scenarios that help to better understand future possibilities and the uncertainties surrounding them. Put in terms of MI principles, laying out plausible future scenarios is analogous to encouraging people to engage in change talk. Scenario planning differs from forecasting, projections, and predictions in that it explores plausible possible futures rather than probable futures, and

it lays out the choices facing society in whole systems terms. We hasten to add that SP has only rarely been used to engage the broader public in thinking about alternative futures for the whole community. To be effective as a societal therapy, it needs to be extended and modified to do so. With appropriate extensions to engage the public via, for example, opinion surveys and deliberative dialogs, “Community Scenario Planning” (CSP) can be seen as incorporating the key MI principles. It first engages participation in a broad discussion of change (plausible futures) and in focusing on shared goals revealed by preferences via surveys for particular futures. CSP can then focus and evoke positive change to- ward preferred futures and motivate planning for effective change.

Several scenario planning exercises have been conducted at a range of geographic scales and for a range of purposes, including: global futures (Costanza, 2000; Millennium Ecosystem Assessment (MEA), 2005; Nakićenović and Swart, 2000; Raskin *et al.*, 2002), regional futures (European Environmental Agency, 2009; Bohensky *et al.*, 2011), corporate strategy (Wack, 1985), political transition (Kahane, 2004) and community-based natural resource management (Wollenberg *et al.*, 2000). For example, the carbon emissions scenarios developed by the IPCC (Nakićenović and Swart, 2000) have been widely used to study their potential impacts on future climates.

One of the most compelling examples of the application of SP was during the transition in South Africa after apartheid. Adam Kahane convened a scenario planning workshop that involved leaders from both white and black political parties (Kahane, 2004). They decided as a group to go beyond recriminations and to create together four possible future scenarios for the country (i.e., the MI principle of engaging in change talk), only one of which – the “flight of the flamingos” – envisioned a shared country with everyone rising together with truth and reconciliation (i.e., the MI principle of focusing on shared goals). The adoption of this scenario by all parties as the preferred future (i.e., the MI principle of planning from goals to actual change) enabled a relatively smooth transition in a situation that could have been much worse had this important consensus about a vision for the country not been reached (i.e., the MI principle of evoking positive change).

CSP can be seen as a way to engage the broader public directly in a positive discussion of societal goals, motives, and futures in a way that is very analogous to MI, as discussed above. However, to date, as in the South Africa example, scenario planning has largely been used by small groups of planners, policy makers, and strategists and has yet to be effectively extended to stimulate discussion of alternative futures and goals among the broader public.

Some small steps in this direction include Costanza (2000) and Landcare (2007). Both of these studies included limited surveys of opinions and ranking of the scenarios. The results were intriguing. For example, in the Landcare case, respondents were asked which of four scenarios they thought New Zealand was headed toward and which of the four scenarios they preferred for themselves and the country. There was very little overlap in the results to these two questions. The scenario most respondents said they preferred was “Independent Aotearoa” – a sustainable well-being scenario, but the scenario they thought they were headed toward was “Fruits for a Few” – a business as usual scenario with increased inequality.

To broaden participation, Costanza *et al.* (2015) proposed a country- wide survey of scenarios for Australia. They reviewed a broad range of scenarios of the future developed for Australia and globally in a range of participatory processes and developed a synthesis

set of four scenarios for Australia. These four synthesis scenarios were structured around two axes: (1) individual vs. community orientation and (2) continued focus on GDP growth or shift of focus to broader well-being. This created four distinct futures labeled: (1) Free Enterprise; (2) Strong Individualism; (3) Coordinated Action; and (4) Community Well-Being. For each scenario a narrative and other descriptions of the scenario were created. A country-wide opinion survey of the scenarios was carried out in May and June of 2016. Preliminary results showed that 71% of a randomly selected sample of over 2000 participants preferred the Community Wellbeing future—the opposite of the emphasis on short-term, individualistic goals that perpetuate our current societal addiction. However people also thought the Community Wellbeing future was Australia's least likely future, with just 17% believing this is where Australia is heading. The most likely future people saw for Australia was a continuation of Free Enterprise, which is based on economic growth at the expense of equity and environmental quality. These results showed the significant difference between where Australians felt Australia was heading and where they wanted it to go. Follow-on activities to further engage the public in thinking about the kind of future they really want and sharing their opinions with others is planned to continue the “therapy.”

In a related exercise, the Australian Academy of Science led the ‘Australia 2050’ project, which embarked on activities to support wide-spread, inclusive national conversations on the country’s future (see video and reports at <https://www.science.org.au/publications/australia-2050>). One of the Australia 2050 events gave participants from diverse sectors of society the opportunity to explore ‘growth’, ‘collapse’, ‘restraint’ and ‘transformation’ futures (Cork *et al.*, 2015). They were not expected to agree with one another, and instead encouraged to listen with curiosity and respect for others’ perspectives in the spirit of MI “engaging in change talk.”

These kinds of examples point to the kind of societal therapy that might work in a manner analogous to MI. Scenarios by definition focus on “change talk”, although skill is required to encourage participants to think beyond business as usual. Well-facilitated scenarios can be autonomy supportive by encouraging participants to identify aspects of the future they wish to encourage and other aspects they would like to avoid. This can both create a wish to be involved in making the future and generate ideas about how this can be done in partnership with others. CSP processes that encourage empathy, compassion, and acceptance through listening and understanding before debate and action, can help participants see their own strengths and weaknesses and reveal strengths and weaknesses in others that can give participants more hope about creating and implementing sustainable and desirable futures.

7.2. Cultural Evolution and Scenario Planning

One famous psychology joke asks, “How many psychologists does it take to change a light bulb? Answer: Only one—but the light bulb has to really want to change.” This joke indicates the centrality of the idea that in therapy, a therapist cannot force people to change their thoughts, feelings, attitudes and preferences. So how can we facilitate a process by which a whole society both explores its desires for change and comes to some agreement about what that change should look like?

Recent research on organisations and societies that have shown high capacity to adapt or transform in the face of challenges has revealed the importance of recognizing, not only the likelihood of challenges, but also that current approaches to dealing with

those challenges might be ineffective (Walker et al., 2004; Folke *et al.*, 2010). Getting a society to accept the reality of challenges like climate change, for example, might not be enough to get it to want to change if the people in that society think its institutions and other resources will not be able to cope with the challenge.

It is important to note here the differences between getting individuals within society to change their behavior and getting society as a whole to change. Society is not just a collection of individuals. It also includes all the formal and informal rules, norms, laws, and institutions that make up the society and culture (i.e., social capital) within which individuals operate and cooperate. Getting people to change their individual behavior without changing the culture is like swimming upstream against a very strong current. But cultures do evolve and change as new rules, norms, laws and institutions develop and become widespread. So, what we are really talking about is how to accelerate cultural evolution in the direction of a more sustainable and desirable future (Costanza, 2014).

However, like other evolutionary processes, cultural evolution is prone to path dependence, multiple equilibria, lock-in, traps and societal addictions (Costanza, 1987; Arthur, 1988; Costanza *et al.*, 1993). Many historical civilizations have collapsed due to their inability to escape these processes (Tainter, 1988; Costanza *et al.*, 2007; Diamond, 2005). For example, the ancient Maya developed elaborate trade networks, elites, and cities that lost resilience to recurring drought cycles and eventually collapsed (Diamond, 2005; Heckbert *et al.*, 2014). On the other hand, one unique feature of cultural evolution compared to biological evolution is that it is “reflexive,” in the sense that goals and foresight can affect the process. As Beddow *et al.* (2009) put it:

“To a certain extent, we can design the future that we want by creating new cultural variants for evolution to act upon and by modifying the goals that drive cultural selection. If our societal goals shift from maximizing growth of the market economy to maximizing sustainable human well-being, different institutions will be better adapted to achieve these goals. As we learn more about the process of cultural evolution, we can better anticipate the required changes and can more efficiently design new institutional variants for selection to work on”.

CSP is one way to do this at the societal level. By constructing a set of plausible alternative future scenarios, the community can see how current choices might play out, without pre-judging the alternatives. One can then ask the equivalent of “How is our current behavior working?” given the possible consequences that scenario planning can lay out. What is our preferred future and what changes will move us toward that preferred future? CSP, extended to include public opinion surveys about the scenarios, can be seen to embody the four key processes underpinning MI: (1) Engaging in a broad discussion of the possibilities for change by developing alternative future scenarios; (2) focusing on shared goals by developing preferences for futures with specific qualities; (3) evoking and motivating positive change toward preferred futures; and (4) planning for actions and policies that could help achieve this future.

As we have stressed, society is more than the sum of individuals and to change societal behavior we need to change social goals, norms, rules, incentives, etc.—i.e. culture. Societal therapy is ultimately aimed at doing just that. For example, a carbon tax

will be more acceptable in a society that has embraced the goals embedded in the “community wellbeing” scenario than in one addicted to the “free enterprise” scenario.

7.3. Other Relevant Approaches

We do not mean to imply that scenario planning is the only possible therapy at the societal level. The climate change adaptation research community and other research communities involved in tackling common pool resource and sustainability issues are increasingly drawing on participatory approaches that emphasize inclusive, respectful listening aimed at eliciting values and goals, exploring potential change and co-developing plans for change without prescribing predetermined solutions. These include adaptation pathways approaches (e.g., Wise *et al.*, 2014, Fazey *et al.*, 2010), approaches for assessing social-ecological resilience (e.g., Walker and Salt, 2012), and calls for wise stewardship of Earth's ecosystems (e.g. Fischer *et al.*, 2012). There are diverse tools and methods for facilitating such inclusive participation. For example, mathematical modeling can be used as a form of consensus building (e.g., Costanza and Ruth, 1998) and fostering respectful dialogue and engagement with diverse stakeholders (e.g., mediated modeling, van den Belt, 2004, companion modeling, Étienne, 2014, or multi-model approaches, Fulton *et al.*, 2015).

Like therapists working with addicts, researchers involved in these approaches perceive that change is beneficial, and choose methods that enable and support change. This is different from researchers seeking to be impartial observers, who see their role as reporting the facts and leaving others to act on those findings. In this way, these approaches require some care to ensure that any decisions to change are owned by the stakeholders and not imposed by the scientist or activist. Just as it is in MI, clients' autonomy must be respected. To quote Miller and Rollnick (2009):

“MI is not a sleight of hand for end-running, outwitting, or hijacking an individual's motivation. It is about eliciting the person's own inherent arguments for change, not imposing someone else's.”

That said, MI is also not about seeking to explore all perspectives, nor does it involve focusing on reasons not to change. The MI agenda is to inspire and foster change, and it is only change talk that is reflected back to the client and strengthened: ‘it makes little sense to intentionally elicit and give equal air time and attention to the counter-change arguments’.

Similarly, climate adaptation research accepts the inevitability of climate change, and works to understand and build effective strategies for adapting in the face of change. Like a therapist employing MI with an addict, the researcher has already made a judgment about the benefits of change, but that judgment is not one to be imposed on the client. Rather, researchers seek to build relationships and learning processes that strengthen awareness, autonomy and well-informed decision-making among stakeholders. Methods to do this include highlighting adaptation pathways that identify options that do not lock in maladaptive futures. Similarly, resilience researchers recognize the inevitability of a changing world, and when asking questions about resilience (e.g., ‘resilience of what to what?’) they are not seeking to keep everything the same, but instead to work with stakeholders to identify what is valued in their system and

what changes stakeholders are prepared to make, including options to adapt or transform their activities.

Perhaps the most important current global change process relevant to this discussion is the United Nations Sustainable Development Goals (UN, 2015). These 17 global goals were agreed to by all UN member states in September 2015. They embody an essential recognition that we live in a finite and interconnected world where we must integrate prosperity, equity, and sustainability. They cover poverty, inequality, economy, environment, and more. Taken together they represent a positive global scenario meant to apply to all countries. While the SDG's have been agreed to by all UN member states, converting that agreement into a shared vision among the world's people that can drive change is another matter that will require significant additional work. We suggest that a version of CSP might be useful in this regard. The SDG's represent a vision of a positive future not unlike several others that have been put forward in the context of scenario planning (Costanza, 2000; Raskin *et al.*, 2002; MEA, 2005; Landcare, 2007). The 17 SDG's in their present form (with 169 targets and over 300 indicators) will be difficult to communicate to the global public, but a narrative description of the sustainable and desirable SDG vision as one possible future scenario would likely be more compelling to more people. Global surveys of people's preferences for the SDG's scenario in contrast to other scenarios would begin the broader engagement and discussion of the future we want among the global population in the spirit of MI.

Our point is that there are parallels between MI therapy aimed at fostering change in individuals and a range of approaches that are working to support change in social-ecological systems. These parallels suggest the potential to learn more from MI research experience. Interdisciplinary and transdisciplinary research initiatives aimed at better understanding of cultural evolution are central to all of these advances in better navigating complex social-ecological futures. There is certainly much room for further development, and consideration of what works at the individual scale may help to guide these societal processes in more productive directions.

8. Conclusions

MI is successful at the individual level because of its balanced combination of client-centered attitudes and goal-oriented processes. It helps individuals to recognize and articulate what is not working for them in their current behavior, without being too confrontational or directing. On the other hand it is goal-oriented and helps individuals to envision and create more positive futures for themselves.

If an individual does not want to change, then MI would suggest allowing that to be the case and reflecting it back to the person. That is the only way to maintain rapport with the client. This can be followed up with an exploration of whether or not the person's current behavior is working well for him/her and matching his/her values and goals. As such, if a client says "I don't want to change," rather than just letting it go at that, the therapist can say "OK, I hear that you don't want to change. I wonder if we could talk about how you see your current behavior now in the context of your values and goals, so that I can understand why you feel like your current behavior is working well for you." That conversation might lead the individual to provide a strong rationale for the status quo, or it might lead the individual to recognize that there are some mismatches between his/her current behaviors and values. If the latter occurs, it is an excellent opportunity for an MI therapist to help evoke some change talk and begin the process of positive change.

At the societal level, making the transition to a sustainable and desirable future will not be easy and will require a more nuanced conversation and consensus building about societal goals than has so far been the case. In many ways humans are locked-in, trapped, and in a very real sense “addicted” to the current regime. Growing knowledge of how to overcome individual addictions may help if that knowledge can be scaled up to the societal level. Evidence suggests that directly confronting addicts with their problems in an effort to scare them into changing often leads to denial and reactance, and is therefore often counterproductive. Yet this is exactly what many scientists and activists currently do at the societal level regarding issues like climate change, overpopulation, overconsumption, and inequality. Presenting evidence about risks is important, but how that evidence is presented and contrasted with values and positive goals is critical if we hope to change behavior at either the individual or societal levels.

At the individual level, MI techniques engage with addicts in a non-judgmental way to help them overcome ambivalence and develop a positive vision of a better life that is based in their deepest values. Such a vision can often motivate substantial change. This is what a strategy of what we have labeled CSP (scenario planning and envisioning extended to include public opinion surveys and broad societal dialogue about alternative futures) could provide at the societal level. What is necessary to implement this strategy is to fully engage the larger society in discussing and sharing alternative futures and building consensus on preferred futures. Putting future scenarios out to the public in the form of public opinion surveys (Costanza *et al.*, 2015), dialogs, media events, and other approaches can do this, but this is a largely unexplored area. There is ample room for creative design and testing of a range of societal therapies. Scaling up what works at the individual level may be an important path to more effective societal therapies that will allow humans to build a sustainable and desirable future together.

References

- American Psychiatric Association, 2013. Diagnostic and Statistical Manual of Mental Disorders. 5th edition. APA, Washington DC.
- Ariely, D., 2009. Predictably Irrational. HarperCollins Publishers, Great Britain.
- Arthur, W.B., 1988. Self-reinforcing mechanisms in economics. In: Anderson, P.W., Arrow, K.J., Pines, D. (Eds.), *The Economy as an Evolving Complex System*. Addison-Wesley, Redwood City, CA, pp. 9–31.
- Beddoe, R., Costanza, R., Farley, J., Garza, E., Kent, J., Kubiszewski, I., Martinez, L., McCowen, T., Murphy, K., Myers, N., Ogden, Z., Stapleton, K., Woodward, J., 2009. Overcoming systemic roadblocks to sustainability: the evolutionary redesign of worldviews, institutions and technologies. *Proc. Natl. Acad. Sci.* 106, 2483–2489.
- Biglan, A., 2015. *The Nurture Effect: How the Science of Human Behavior Can Improve Our Lives & Our World*. New Harbinger, Oakland, CA.
- Bohensky, E.L., Butler, J., Costanza, R., Bohnet, I., Delisle, A., Fabricius, K., Gooch, M., Kubiszewski, I., Lukacs, G., Pert, P., Wolanski, E., 2011. Future makers or future takers? A scenario analysis of climate change and the Great Barrier Reef. *Glob. Environ. Chang.* 21 (3), 876–893.
- Brockner, J., Rubin, J.Z., 1985. *Entrapment in Escalating Conflicts: A Social Psychological Analysis*. Springer, New York.

- Carpenter, S.R., Brock, W.A., 2008. Adaptive capacity and traps. *Ecol. Soc.* 13, 40.
- CDC (Centers for Disease Control and Prevention), 2011. Quitting smoking among adults: United States, 2001–2010. *Morb. Mortal. Wkly Rep.* 60, 1513–1519.
- Cork, S., Grigg, N., Alford, K., Finnigan, J., Fulton, B., Raupach, M., 2015. Australia 2050: Structuring Conversations about our Future. Australian Academy of Science, Canberra (<https://2-science.cdn.aspedia.net/sites/default/files/user-content/resources/file/australia-2050-vol-3.pdf>).
- Costanza, R., 1987. Social traps and environmental policy. *Bioscience* 37, 407–412. Costanza, R., 2000. Visions of alternative (unpredictable) futures and their use in policy analysis. *Conserv. Ecol.* 4 (1), 5.
- Costanza, R., 2014. A theory of socio-ecological system change. *J. Bioecon.* 16, 39–44. Costanza, R., Ruth, M., 1998. Using dynamic modeling to scope environmental problems and build consensus. *Environ. Manag.* 22 (2), 183–195. <http://dx.doi.org/10.1007/s002679900095>.
- Costanza, R., Shrum, W., 1988. The effects of taxation on moderating the conflict escalation process: an experiment using the dollar auction game. *Soc. Sci. Q.* 69, 416–432. Costanza, R., Wainger, L., Folke, C., Mäler, K.-G., 1993. Modeling complex ecological economic systems: toward an evolutionary, dynamic understanding of people and nature. *Bioscience* 43, 545–555.
- Costanza, R., Graumlich, L., Steffen, W., Crumley, C., Dearing, J., Hibbard, K., Leemans, R., Redman, C., Schimel, D., 2007. Sustainability or collapse: what can we learn from integrating the history of humans and the rest of nature? *Ambio* 36, 522–527.
- Costanza, R., McGlade, J., Lovins, H., Kubiszewski, I., 2014. An overarching goal for the UN sustainable development goals. *Solutions* 5 (4), 13–16 (<http://thesolutionsjournal.com/node/237220>).
- Costanza, R., Kubiszewski, I., Cork, S., Atkins, P.W.B., Bean, A., Diamond, A., Grigg, N., Korb, E., Logg-Scarvell, J., Navis, R., Patrick, K., 2015. Scenarios for Australia in 2050: a synthesis and proposed survey. *J. Futur. Stud.* 19, 49–76.
- Courtney, M., Spivey, C., Daniel, K., 2014. Helping patients make better decisions: how to apply behavioral economics in clinical practice. *Patient Prefer. Adher.* 8, 1503–1512.
- Cross, J.G., Guyer, M.J., 1980. *Social Traps*. University of Michigan Press, Ann Arbor. Diamond, J., 2005. *Collapse: How Societies Choose to Fail or Succeed*. Viking Press, New York.
- Edney, J.J., Harper, C., 1978. The effects of information in a resource management problem: a social trap analog. *Hum. Ecol.* 6, 387–395.
- Étienne, M. (Ed.), 2014. *Companion Modelling*. Springer Netherlands, Dordrecht. European Environment Agency, 2009. Looking back on looking forward: a review of evaluative scenario literature. Tech. Report No. 3, p. 26 (Denmark: Copenhagen).
- Fazey, I., Kesby, M., Evely, A., Latham, I., Wagatora, D., Hagasua, J.-E., Reed, M.S., Christie, M., 2010. A three-tiered approach to participatory vulnerability assessment in the Solomon Islands. *Glob. Environ. Chang.* 20 (20th Anniversary Special Issue), 713–728. <http://dx.doi.org/10.1016/j.gloenvcha.2010.04.011>.
- Fischer, J., Dyball, R., Fazey, I., Gross, C., Dovers, S., Ehrlich, P.R., Brulle, R.J., Christensen, C., Borden, R.J., 2012. Human behavior and sustainability. *Front. Ecol. Environ.* 10, 153–160. <http://dx.doi.org/10.1890/110079>.

- Folke, C., Carpenter, S.R., Walker, B., Scheffer, M., Chapin, T., Rockström, J., 2010. Re- sili- ence thinking: integrating resilience, adaptability and transformability. *Ecol. Soc.* 15 ([online] https://www.ivey.uwo.ca:444/cmsmedia/222506/Resilience_thinking_IntegratingResilience__Adaptability_and_Transformability.pdf).
- Fulton, E.A., Boschetti, F., Sporcic, M., Jones, T., Little, L.R., Dambacher, J.M., Gray, R., Scott, R., Gorton, R., 2015. A multi-model approach to engaging stakeholder and modellers in complex environmental problems. *Environ. Sci. Pol.* 48, 44–56. <http://dx.doi.org/10.1016/j.envsci.2014.12.006>.
- Hardin, G., 1968. The tragedy of the commons. *Science* 162, 1243–1248.
- Hayes, S.C., Wilson, K.G., Gifford, E.V., Bissett, R., Piasecki, M., Batten, S.V., ... Gregg, J., 2004. A preliminary trial of twelve-step facilitation and acceptance and commitment therapy with polysubstance-abusing methadone-maintained opiate addicts. *Behav. Ther.* 35 (4), 667–688.
- Heckbert, S., Costanza, R., Parrott, L., 2014. Achieving sustainable societies: lessons from modelling the ancient Maya. *Solutions* 5 (5), 55–64 (<http://www.thesolutionsjournal.com/node/237204>).
- Heiner, R.A., 1983. The origin of predictable behavior. *Am. Econ. Rev.* 560–595.
- Kahane, A., 2004. *Solving Tough Problems: An Open Way of Talking, Listening, and Creating New Realities*. Berrett-Koehler, San Francisco.
- Kahneman, D., 2011. *Thinking, Fast and Slow*. Farrar, Straus and Giroux, New York.
- Landcare Research Scenarios Working Group, 2007. *Four Future Scenarios for New Zealand: Work in Progress*. 2nd ed. Manaaki Whenua Press, Lincoln, New Zealand.
- Lanza, P.V., García, P.F., Lamelas, F.R., González-Menéndez, A., 2014. Acceptance and commitment therapy versus cognitive behavioral therapy in the treatment of substance use disorder with incarcerated women. *J. Clin. Psychol.* 70 (7), 644–657.
- Low, D., 2012. *Behavioural Economics and Policy Design: Examples from Singapore*. World Scientific Publishing Co., Singapore.
- Lunn, P., 2014. *Regulatory Policy and Behavioural Economics*. OECD Publishing <http://dx.doi.org/10.1787/9789264207851-en>.
- MEA (Millennium Ecosystem Assessment), 2005. *Ecosystems and Human Well-Being: Volume 2. Scenarios*. Island Press, Washington, D.C.
- Miller, W.R., Rollnick, S., 2009. Ten things that motivational interviewing is not. *Behav. Cogn. Psychother.* 37, 129–140.
- Miller, W.R., Rollnick, S., 2012. *Motivational interviewing. Helping People Change*, Third edition Guilford Publications, New York.
- Nakićenović, N., Swart, R. (Eds.), 2000. *Emissions Scenarios. Special Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK.
- Peterson, G.D., Cumming, G., Carpenter, S.R., 2003. Scenario planning: a tool for conservation in an uncertain world. *Conserv. Biol.* 17, 358–366.
- Platt, J., 1973. Social traps. *Am. Psychol.* 28, 641–651.

- Raskin, P., Banuri, T., Gallopin, G., Gutman, P., Hammond, A., Kates, R., Swart, R., 2002. Great Transition: The Promise and Lure of the Times Ahead. Stockholm Environment Institute, Boston.
- Rogers, C.R., 1951. Client-centered Therapy: Its Current Practice, Implications, and Theory. Houghton Mifflin Company, Boston.
- Rogers, C.R., 1961. On Becoming a Person. Houghton Mifflin Company, Boston. Rothstein, B., Uslaner, E.M., 2005. All for all: equality, corruption, and social trust. *World Polit.* 58, 41–72.
- Smout, M.F., Longo, M., Harrison, S., Minniti, R., Wickes, W., White, J.M., 2010. Psychosocial treatment for methamphetamine use disorders: a preliminary randomized controlled trial of cognitive behavior therapy and acceptance and commitment therapy. *Subst. Abuse.* 31 (2), 98–107.
- Sussman, S., Sussman, A.N., 2011. Considering the definition of addiction. *J. Environ. Res. Public Health* 8 (10), 4025–4038.
- Tainter, J.A., 1988. The Collapse of Complex Societies. Cambridge University Press, Cambridge (UK).
- United Nations, 2015. Transforming our world: The 2030 agenda for sustainable development. Outcome Document for the UN Summit to Adopt the Post-2015 Development Agenda. United Nations, New York, NY.
- van den Belt, M., 2004. Mediated Modeling: A Systems Dynamics Approach to Environmental Consensus Building. Island Press, Washington, DC.
- Wack, P., 1985. Scenarios: uncharted waters ahead. *Harv. Bus. Rev.* 63, 72–89.
- Walker, B., Salt, D., 2012. Resilience Practice: Building Capacity to Absorb Disturbance and Maintain Function. Island Press.
- Walker, B., Holling, C.S., Carpenter, S.R., Kinzig, A., 2004. Resilience, adaptability and transformability in socialecological systems. *Ecol. Soc.* 9, 5 ([online]. <http://www.ecologyandsociety.org/vol9/iss2/art5/>).
- Wheeler, D.R., Woodall, G., Rogers, E., 2002. Victim impact panels: do they impact drinking and driving behavior? Paper Presented at the Proceedings of the 16th international conference on alcohol, drugs and traffic safety
- Wise, R.M., Fazey, I., Stafford Smith, M., Park, S.E., Eakin, H.C., Archer Van Garderen, E.R.M., Campbell, B., 2014. Reconceptualising adaptation to climate change as part of pathways of change and response. *Glob. Environ. Chang.* 28, 325–336. <http://dx.doi.org/10.1016/j.gloenvcha.2013.12.002>.
- Wollenberg, E., Edmunds, D., Buck, L., 2000. Using scenarios to make decisions about the future: anticipatory learning for the adaptive co-management of community forests. *Landsc. Urban Plan.* 47, 65–77.

Previously published: Costanza, Robert, *et al.* “Overcoming Societal Addictions: What Can We Learn from Individual Therapies?” *Ecological Economics* 131 (2017): 543-550.

Gabriel Kuhn: Straight Edge Developed Into a Culture of Its Own, and It's Here to Stay

by DIY Conspiracy

Gabriel Kuhn is an Austrian-born writer, translator and union activist living in Sweden. He has published widely in English and German since the '90s, including his straight edge related books *Sober Living for the Revolution: Hardcore Punk, Straight Edge, and Radical Politics* (2010) and *X: Straight Edge and Radical Sobriety* (2019), as well as the German introduction *Straight Edge. Geschichte und Politik einer Bewegung* (2010). They all seek to bring together a straight edge identity with anarchist, autonomist and left-wing politics.

Hey Gabriel, do you mind sharing some background about how and when you first got involved with hardcore punk music and straight edge?

I came to hardcore punk through metal. I grew up in a small town in the Austrian Alps, and you could only choose between two types of music: pop or metal, the latter being the “rebel music” of all stripes. This was before the Internet, so it wasn’t that easy to find other kinds of music. There were some punk bands, however, that had entered metal circles, like the Dead Kennedys or The Exploited. That made me curious about punk, and when I was old enough to take the train to Munich and go shop at record stores that had actual punk sections, I discovered more and more. Eventually, I found out about straight edge, which was terribly exciting, because I had never been into drinking, which was very unusual for a metalhead in our neck of the woods (and perhaps anywhere?). It really opened up a new world for me.

Can you talk about your experience with the straight edge scene in the US around 1994? What were the bands, zines and politics that you were looking up to at the time?

It was a very special experience. I moved to the US in the Summer of 1994. My image of straight edge was still very 1980s, because those were the bands I had listened to in Europe. The whole Vegan Straight Edge thing had only just started there. The first Straight Edge as Fuck sampler on Desperate Fight had just come out. In the US, Earth Crisis were already big and gave straight edge a whole new direction, politically and musically. Metalcore, naturally, appealed to me, so that was all good, and I was also

intrigued by the political outspokenness. Yet, there was something about the machismo, self-righteousness, and moralism that didn't appeal to me at all, let alone the anti-abortion stances and the homophobia. Not necessarily with Earth Crisis, I don't wanna get into that debate, but with individuals, bands, and zines that associated themselves, at least in a wide sense, with the Vegan Straight Edge scene. Shelter and 108 had also popularized Krishnacore, and there was Hardline, of course—a fairly small scene perhaps, but very vocal. Some of it was confusing for me, because it was far removed from my politics, but it was also a very exciting time. There were dozens of active straight edge zines, I corresponded with straight edge folks almost daily, we traded tapes, etc. I'm not saying that it was a better culture than today, just very different. And I enjoyed it despite all the confusion. Bands I really liked were Snapcase and Chokehold. I actually liked Krishnacore zines, like the one that Equal Vision (the label) brought out, or, later, Porcell's War on Illusion. I had my reservations when it came to the philosophy and the culture, but there was much food for thought. Politically, I just jibed more with the European bands.

Do you see anything fundamentally different between the peak of European straight edge with outspokenly leftist bands like Manliftingbanner, Nations on Fire, and Refused, compared to Earth Crisis and the likes?

I just think the political background was very different. It was something I had to learn when I moved to the US. Before that, I thought that being a "radical" and a "leftist" was pretty much the same thing. But it's not. Leftist politics—by which I mean politics with a strong focus on class and equality—were strong in the US until the 1930s, but then took a serious dive. Even the rebellion of the 1960s had strong cultural and individualistic tendencies, even if there were leftist currents too, of course. But I think the animal rights and ecological scenes that morphed with vegan straight edge in the 1990s just didn't have much of a leftist background. So it was easy for issues such as class, but also gender and race, to "fall under the table", as we German speakers say. It seemed different in Europe, where this was more part of the package if you wanted to be a political straight edger. I think the same would be true for Latin America, as you could see with bands like Point of No Return. But don't get me wrong: I don't want to play out one scene against another. The militancy of US vegan straight edge was badass. Many of these folks walked the walk, engaged in direct action and took big personal risks. That was inspiring.

How did you come up with the idea for *Sober Living For The Revolution* and what makes it so different from other straight edge hardcore books that came out in the 2000s?

I felt that straight edge had a bad reputation in the leftist circles I moved in. All that people saw was the machismo, the self-righteousness, and the moralism. I knew that these elements existed, but having been straight edge for so long, I also knew that there were many other aspects to the culture. I wanted to portray that. When *Sober Living* came out, I think it was only the fourth book about straight edge to come out ever. Beth Lahickey's *All Ages: Reflections on Straight Edge* was a collection of interviews, and the books by Ross Haenfler and Robert T. Wood were overviews from a sociological angle. I

guess the explicit connection between straight edge and radical/leftist politics offered by *Sober Living* just hadn't been done before.

And how about its follow-up *X: Straight Edge and Radical Sobriety* being different from *Sober Living*?

I felt that in the decade after *Sober Living* had come out, straight edge diversified even more. It became more international, there were more women, queer, and trans folks involved, and musically it went into all sorts of directions. While earlier straight edge eras always had their defining bands—from Minor Threat to Youth of Today to Earth Crisis—I think that this is no longer the case. Yes, some bands are more popular than others, but there are straight edge kids today who have never listened to Throwdown, and it doesn't matter, 'cause there are so many other bands to listen to and no single one gets to define what it means to be straight edge. So, partly, I wanted to document that development. Then, two other aspects played into it as well: I thought it was very interesting that the term “radical sobriety” had emerged in political circles. It was only loosely connected to straight edge, but there were clear overlaps. This was one thing I wanted to bring into the debate. Another was the question of what straight edge could do for people struggling with addiction and substance abuse. Kinda like: rather than protecting your straight edge territory, how can straight edge reach out and do something positive for the community? I thought that was an important discussion. But, frankly, I also just wanted to do another book on straight edge. Working on *Sober Living* had been so much fun that I longed for a similar experience. And I got it. Working on books can get pretty lonely, but these were projects that involved many people, and it was wonderful to meet, get to know and work with them. I'm very grateful.

There are very few people who are still sober for more than 30 years like yourself. Almost every influential straight edge band from the '80s and '90s are no longer living by example. What do you think is the main reason for breaking the edge? Is it about no longer feeling the need to be part of a shared identity, ideology or just being too young at the time?

Probably a combination of all that. My main take on it is this one: People who find straight edge because they already are sober, like myself, will stay with it. Their sobriety doesn't depend on straight edge, it just finds a home there. People who become straight edge because they want to be part of a scene, or because it seems like a cool thing to do, grow out of it. A related phenomenon is that it is often the loudest and preachiast who, after a few years, no longer care about the edge. People who are fairly mellow about it often remain straight edge much longer. They have nothing to prove, it's just what they are. The preachers, on the other hand, move on once they have found other things to preach about. These are very general observations, of course. Every individual's story is different. But there are always some patterns we can detect.

Do you see similar developments when it comes to sobriety in the context of anarchist, leftist and militant working class culture? How does radical sobriety

differ from straight edge when it's not related to a subculture or a music scene? Is it more about some sort of virtues than a strict practice with lasting effects beyond the discourse?

I would say that even in these contexts, people who simply feel comfortable with sobriety and aren't motivated by identity or ideology will be the ones most likely to stick with it. The main difference between straight edge and forms of sobriety not connected to hardcore punk is that the cultural framework is missing. Philosophically and politically, the discussions can be very similar, but you won't have the same cultural, and social, reference points, connections, and networks. That's why I think it's important to speak of "straight edge" and to distinguish it from other forms of sobriety. There is something unique about the cultural framework that ties straight edge folks together. It gives the culture particular strength and meaning. You can't just replace the term with "sober" or "poison-free". If you don't want to be associated with straight edge culture, by all means, don't call yourself "straight edge" and use one of these other terms, but they don't mean the same. No matter what Ian MacKaye's intentions might have been, straight edge developed into a culture of its own, and it's here to stay.

In Sweden, the "sobriety movement" used to be quite popular in the 1920s and '30s. You also touch on this topic in a few interviews with various people published in your books. Can you elaborate on the history of these movements that were not limited only to Scandinavia?

The history of sobriety movements is a curious one. On the one hand, there are very conservative roots, stemming from religion and freemasonry. On the other hand, sobriety also became a tool of militant working-class movements already in the late 19th century. Needless to say, it is the latter aspects I'm mainly interested in. In Sweden, but also in Austria, the progressive currents in the sobriety movement were very strong in the early 20th century. In Austria, in particular, sobriety was an inherent part of militant working-class culture. The arguments that were used are familiar to any political straight edger today: sobriety helps you to stay focused, act responsibly, keep collective discipline. These concepts aren't necessarily without their problems, but they touch on very central questions of political organizing and political action. In the end, there is probably no right or wrong, but these discussions are very important.

This interview appears in the straight edge zine that comes along with DIY Conspiracy Vol.X compilation tape released in October, 2021.

Also, previously published here: DIY Conspiracy. "Gabriel Kuhn: Straight Edge Developed Into a Culture of Its Own, and It's Here to Stay." *PM Press*. 17 October 2021

<https://www.anarchistfederation.net/gabriel-kuhn-straight-edge-developed-into-a-culture-of-its-own-and-its-here-to-stay/>

<https://blog.pmpress.org/2021/10/20/gabriel-kuhn-straight-edge-developed-into-a-culture-of-its-own-and-its-here-to-stay/>

Straight Edge: Environmental Thinking and Environmental Behavior

By Nikolay Olegovich Kostin, Krakow, Poland [translated from Russian].

Abstract

Background: Environmental issues are one of the most pressing issues of our time. Initial research in this area initiated natural science disciplines. However, the urgency and global nature of this issue caused the emergence of developments in the field of humanities. At the moment we have several large conceptual groups: Arne Naess' ecosophy (and "deep ecology" in general), ecotheology.

Results: The effectiveness of any theory depends on practical implementation. Neither ecosophy nor ecotheology have a systematic and universal practical component. Thus, in search of a solution to the problem of the connection between theory and practice, it is worth leaving the academic environment and turning to modern youth culture.

Scope of the results: The Straight Edge movement implies an inextricable link between theory and practice. Turning to it as a model of ecological thinking allows us to expand the ecological discourse in humanitarian studies.

Conclusions: Without pretending to be a universal solution, as an alternative to purely academic systems of environmental thinking and behavior, we can consider the Straight Edge movement, which has great potential in the field of environmental protection and the development of individual and group style of environmental behavior.

Currently, environmental issues, due to its relevance, occupies an important place in the natural sciences, and in economic, and in the humanities. It is also customary to talk separately about the environmental policy of a state [see: footnote 1, p. 212]. Initially originating in the natural sciences, this layer of research then moved into the sphere of the humanities [see: footnote 13, p. 2]. Within the framework of the humanities, a theoretical understanding of environmental problems was developed. At the moment, there are several theories, which we will discuss in more detail below.

We will use two basic concepts: "environmental thinking" and "environmental behavior." Ecological thinking is a set of ethical principles related to the relationship of man to nature. This is theory. Vivid examples of this phenomenon are the ecosophy of Arne Naess (you can separately take the layer of the so-called "deep ecology") and ecotheology. Ecological behavior is the practical implementation of theoretical principles, that is, the conscious actions of an individual or group aimed at preserving and protecting the environment. The purpose of this article is to illustrate one of the modern models of ecological behavior on the example of a real-life youth subcultural movement. Our task is to show an effective, working system, which at the same time does not pretend to be universal.

Let's start with a review of theoretical approaches. The philosophical views of Arne Naess represent a holistic concept, where we can find the foundations of an ethical attitude towards nature, in other words, the principles of ecological thinking. In his systematic and progressive work "Ecology, community and lifestyle," Naess considers "ecological knowledge" (that is, a component of "ecological thinking") in connection with deep ecology [see: 12, p. 23-35], introduces the concept of "ecosophy" (as a philosophical understanding of natural processes and the role of man in them) [see: 12, p. 35-68] and, as the final stage, a personal "lifestyle" based on the principles of the science of ecology and the ecosophic worldview [see: 12, p. 87-104]. The section "Ecosophy, technology, and lifestyle" is devoted to the European model of ecological behavior, which the author considers the most optimal from both scientific, economic and ethical positions.

The value of Naess's work is indeed significant. In addition to natural scientific research and an ethical approach to problem solving, it also implies a "lifestyle," that is, a practice-oriented synthesis. It would seem that this is an ideal (or very close to ideal) construction: ecological thinking forms ecological behavior. However, the downside is that the practice, the "lifestyle" of Naess, is designed for the Scandinavian countries, taking into account the environmental policies of these states, the structure of the economy and the mentality of citizens. This is not a universal model and should not be expected to work effectively in other regions.

Another approach to the formation of ecological thinking is ecotheology. Ecotheology addresses a large number of issues related to nature. The decisions themselves come from one or another theological setting. This is connected with a huge wealth of interpretations of both the environmental problems themselves and the causes of their occurrence. Within the framework of ecotheology, we see an amazing combination of theological components (primarily, different church traditions) and modern ecology. "Crisis" is a Greek word that means a critical moment when everything that was before is called into question. This may be the judgment of God upon us. This may be the judgment of nature on us, the moment when nature indignantly, indignantly refuses to cooperate with us" [6, p. 12], writes Metropolitan Anthony of Surozh. Feminist ecotheologist Aruna Gnaneydeson puts the key question quite differently: "For too long, people who defend justice have considered the concern for creation to be secondary to other concerns. However, India has always been different, and in recent years, the Indian environmental movement and the women's movement have paid renewed attention to this problem" [2, p. 87]. Accordingly, thoughts about how to solve the global environmental problem will differ radically. For some ecotheologists, this is an appeal to morality, for others, rational judgments in the field of economics and the role of the church in it, for others, eschatological expectations and quotations from Holy Scripture.

The theoretical richness of this trend is undeniable. The very phenomenon of ecotheology is extremely progressive, and it is joyful to see the continuation of the works of modern theologians in ecological discourse. However, there is a significant drawback—with all the splendor of constructions and non-trivial synthesis, these works often remain purely within the academic field. Of course, no one canceled the social influence of the church (various confessions). But, as ecotheologists themselves admit, it is quite difficult to influence the flock in this way.

To implement the theoretical provisions, practical principles are required, that is, "ecological behavior." Theory is extremely important, but it can be considered relevant only in connection with a practice suitable for its implementation. That is why there are

significant difficulties in solving environmental problems. Environmental policy is an official and regulated phenomenon. It is impossible to talk about its meaninglessness, but in many respects it is only a system of prohibitions and control (in relation to enterprises and individual citizens). Moreover, many environmental activists talk about the “anti-environmental policy” of individual states. This is due to the encouragement by the state of the functioning of toxic enterprises. Such a system, as a rule, does not develop ecological thinking and behavior.

What is the practice of solving environmental problems? As it was said, anthropocentrism in this matter is primordial, so the beginning of solving the problem comes down to a person's attitude to himself as a representative of the ecosystem, to his own health and lifestyle. Next is the attitude to the external environment and concern for it. Based on this as a starting point, we can count several forms of practical implementation of these ideas in our modern society.

The first and well-known is the promotion of a healthy lifestyle. It starts, as a rule, from the school bench. In biology lessons, the basics of life safety, physical education, and at individual educational events, they talk about the harmful effects of bad habits. Traditional set: smoking is bad; drinking alcohol is harmful; drugs lead to death. But let's be honest—few of the students are affected by this. They, as a rule, are well aware of the dangers of all of the above, but they see a completely different picture. In a society outside the school, people consume all these products. This scheme does not work precisely because there is no personal meaning behind the prohibitions. Roughly speaking, whether or not to drink alcohol is my personal choice, and the consequences of this are my personal health. The bottom line is only prohibitions and dust-covered moralism. Those who listen to this content often do not take it seriously - after all, the submission form itself is outdated.

There is also a more fashionable and attractive option - these are youth projects. At the moment in Russia, the most striking example of such a phenomenon is the “Лев Против” (“Lion Against”) movement [see: 5]. What is his message?—bad habits are evil. People drinking alcohol and smoking on the streets should be stopped. The people who left the bottles behind are to be blamed. How? We need to take away their bottles, forcibly put out cigarettes. In case of refusal or resistance, use force. As a result, the following happens: under the slogans of a healthy lifestyle, patriotism, compliance with the law, nationalist sentiments are warmed up (which is sometimes noticeable in the rhetoric of “activists”), direct violations of the law (beating people, unauthorized filming with the subsequent appearance of a video on the Internet). This model works on several clear markers.

1) *Visual*. Memorable, brutal appearance of the leader. The leader of the project, Mikhail Lazutin, has an athletic build, short hair and a beard. All this is a good element of promoting sports and a healthy lifestyle for the young population.

2) *Behavioral*. First of all, it is aggression. After deliberately polite phrases, a stage of physical violence begins: bottles of alcohol, cigarettes are taken away from citizens and they are often beaten. There is a known case of beating pensioners by such activists and many other hooligan actions [see: 4].

3) *Ideological*. Hidden nationalist and chauvinist overtones. Those who have bad habits are *a priori* bad people, they harm others and their country as a whole. These are people of the lowest grade, who either need to be “retrained” or “punished” (remember here one of the most famous studies of Michel Foucault). In fact, the first two markers serve to form and root the latter. Everyday manifestations of chauvinism are unlikely to help a person develop a conscious attitude towards both his health and the ecosystem.

In fact, this model of ecological behavior does not work in the right direction for the same reason as the first one—there is no sense behind all these calls. However, in the latter case, there is a significant social threat. It is quite normal to be free from bad habits and not to litter. It is necessary to follow the laws of your country. But cruelly oppressing others for different behavior is abnormal and immoral. In fact, the meaning of this whole project (and others like it) is a splash of latent aggression among young people. Significantly aggravates the matter of everyday fascism. Never before has anything positive been born within the framework of fascist sentiments. It is impossible to create a sober system of ecological behavior by violence and chauvinism. (A clarification needs to be made here: the term “fascism” is used in a modern and broad sense. A complete and analytical description of this phenomenon as “ur-fascism” is given by Umberto Eco in his famous work “Eternal Fascism” [10, pp. 49–80].)

Thus, the question arises: how is it possible to combine ecological behavior with respect for individual freedom and practical concern for one's own organism and nature in general?

Without pretending to be a universal solution, we can offer another youth movement, guided by completely different principles. This movement is called “Straight Edge” (abbreviation SxE is used symbolically for short).

The Straight Edge movement arose in line with the musical (and later subcultural) transformation of punk rock music in the 80s of the XX century. Due to a change in style (a heavier sound, an accelerated tempo of the composition, a different construction of texts), a new musical style arises—hardcore punk (hardcore).

This movement is inextricably linked with the hardcore punk subculture and, accordingly, with the ideas that it includes: individualism, veganism, anti-fascism, animal protection, care for the environment. In this issue, the last aspects are especially important for us—animal protection and care for the environment. The ideological diversity of Straight Edge makes it somewhat difficult to describe it as a system of ecological thinking and behavior. The central writings on which many Straight Edge principles are based are John Joseph McGowan’s “Meat is for Pussies” [see: 3] and a book created with the participation of Ian McKaye [see: 11]. Both of these figures are significant in both the hardcore punk music movement and the Straight Edge movement. The book by McGowan, the leader of the cult hardcore band Cro-Mags, as well as the lyrics of his songs, talk about the importance of quitting bad habits. In addition to harm to the body and consciousness, this is perceived as a refusal to finance alcohol and tobacco corporations, “which are killing us” [3]. McGowan talks a lot about the importance of veganism as an ethical principle of modern man. The fight for animal rights is perceived as a genuine necessity, because by protecting animals, you protect the world around you and, ultimately, yourself. From here comes the rhetoric about the importance of animal

protection and the preservation of the ecological balance by each individual, a conscious individual

Ian McKaye essentially introduces the term “Straight Edge” into wide circulation. In 1981, a song appeared on behalf of his group, which bears the same name. The call to “always keep oneself under control” [8], to develop and not degrade, has become the anthem of this movement and subculture. A conscious attitude to one’s own health and behavior, just like McGowan’s, is inextricably linked with the attitude to the ecosystem, to the planet as a whole. In practice, he implements the ethical principles of D. I. Y. (eng. “do it yourself”), that is, the absolute independence of his actions, the rejection of any commercial support from the outside, using the example of his record label. By analogy, McKaye in the book “The Idealist” speaks of the full responsibility of each person in the matter of preserving nature [see: 11, p. 56]. Protecting nature is protecting yourself—this is the main message of Straight Edge’s ecological thinking.

However, our task is to consider such a model that would work in our society and in the modern world of digital technologies, spreading “cultural memes” and universal network communication [see: 7, p. 22–39]. In modern Russia, many hardcore bands serve as translators of these ideas. Territorial centers of Russian hardcore punk: Ufa, St. Petersburg, Moscow, Kirov, Petrozavodsk. The most active members of the Straight Edge movement (group) within the hardcore culture: What We Feel, Unsubs, Test Line, 210, Apache. In the texts of their songs, a synthesis of the ideas of veganism and environmental protection is made. A vivid example (we give one so as not to overload the text with them) is the song “Voice of Animals” by the group “What We Feel”: “The meat industry, the conveyor of the death factory takes the lives of millions of living beings. Torment and suffering fill the souls, innocent creatures are doomed to death” [9]—veganism is understood here as an ethical choice, and not just a method of dietary nutrition. Thanks to the control over oneself and one’s body, one sees a real, practical protection of nature, the achievement of greater justice and ecological balance in relation to it. The song ends with a logical conclusion—each person bears personal responsibility for protecting nature, only thanks to his conscious position is it possible to preserve both nature and man: “You will not escape the court! It is inside you—dead food—the corpses of dead animals. Having assumed the duties of an executioner, killing them, you are killing yourself” [9].

Despite the obvious variety of ideas and forms of their presentation—fiction books, journalistic articles, lyrics, exhibitions, etc., there are several basic principles and provisions of Straight Edge.

1) *The principle of substitution.* Giving up bad habits, changing your behavior and everyday habits, it makes no sense to see the goal in the very refusal. It is absolutely fine not to drink alcohol and not to litter. It is important to replace the destructive component of your behavior with a productive one—to engage in creativity, self-education, etc. The point is precisely in change, not refusal, in the release of time and physical resources for more fruitful and positive processes.

2) *Respect for individuality.* Since the Straight Edge movement, like the entire hardcore culture as a whole, takes the principles of mutual respect, solidarity and individualism as an ethical basis, there can be no talk of a violent impact on a person. The meaning of this

principle is that a change in behavior and thinking cannot be achieved by aggression, but only by an ideological and emotional message to a person.

3) *From respect for individuality to the protection of nature.* As we have seen above, these two points are closely intertwined in the idea of the movement under consideration. Nature in this case appears as a huge number of individual forms of life, therefore their exploitation is an immoral and harmful action for the whole society.

The Straight Edge movement itself is international in nature, with supporters all over the world. This is a big plus, since interaction, mutual assistance, and exchange of experience make it possible to more and more accurately implement ecological behavior in different regions and different conditions (which we did not see in the previous examples of ecological behavior models).

The movement has clear social markers:

- unusual, avant-garde music;
- diversity of ideas and practices;
- respect for individuality and openness;
- novelty and honesty, sincerity.

All this makes it possible, on the basis of the above principles, to build a behavioral model, that is, “environmental behavior.” In this case, theory and practice really exist inseparably with each other. Moreover, internationality and social openness make it possible to find other, more precise and practical forms of environmental protection.

Speaking about the anthropocentric attitude, one can make an assumption that the further development of the Straight Edge movement, taking into account the idea of the individuality of life forms in nature, will allow us to get out of the selfish and vicious circle of anthropocentrism. Thus, we can assume that this social phenomenon is a progressive form of ecological thinking and behavior.

References

1. Bill J. Thesis of Social Ecology and Superecology [Tezisy o sotsialnoy ekologii i superekologizme]. Samarskaya Luka: problemy regionalnoy i globalnoy ekologii (Samarskaya Luka: Problems of Regional and Global Ecology), 2012, vol. 21, no. 2, pp. 211–216.
2. Gnaneydeson A. Woman, Economy and Ecology [Zhenshchina. ekonomika i ekologiya]. Ekoteologiya. Golosa Severa i Yuga (Ecotheology. Voices of the North and South). Moskow: Ispo-Servis, 1997.
3. Loseph J. Meat Is for Pussies [Myaso dlya slabakov]. 2011, 162 p.
4. Do “Leo Against” Activists Have the Right to Molest People and Take Away Alcohol and Cigarettes from Them? [Imeyut li pravo aktivisty «Lev protiv» pristavat k lyudyam i otbirat u nikh alkogol i sigarety?]. Available at: <https://thequestion.ru/questions/229373/imeyut-li-pravo-aktivisty-lev-protiv-pristavat-k-lyudyam-i-otbirat-u-nikh-alkogol-i-sigarety> (accessed 13 October 2019)
5. Leo Against [Lev protiv]. Available at: <https://www.youtube.com/channel/UCUBoIo2p7GSRMt1YcSswDEw> (accessed 13 October 2019)
6. Metropolitan Anthony of Sourozh. Christianity and the Ecological Crisis [Khristianstvo i ekologicheskiy krizis]. Ekoteologiya. Golosa Severa i Yuga (Ecotheology. Voices of the North and South). Moskow: Ispo-Servis, 1997, pp. 13–19.
7. Openkov M. Y. Hack of Future: an Introduction to the Philosophy of a Knowledge Society [Khakni budushcheye: vvedeniye v filosofiyu obshchestva znaniy]. Moscow: MOO VPP UNESCO “Informatsiya dlya vsekh”, 2007, 127 p.
8. Song of “Minor Threat” – “Straight Edge”, 1981.
9. Song of “What We Feel” – “Animal Voice”, 2009.
10. Eco U. Five Moral Pieces [Pyat esse na temy etiki]. Saint Petersburg: Symposium, 2003, 37 p.
11. Friedman G. E. The Idealist: In My Eyes Twenty Years. New York: Burning Flags Press, 1998, 148 p.
12. Naess A. Ecology, Community and Lifestyle. Cambridge: Cambridge University Press, 1989, 223 p.
13. O’Callaghan O. Orchestration of Ecology, as Ecology. Proceedings of the Symposium “Music and Ecologies of Sound. Theoretical and Practical Projects for a Listening of the World”. University Paris 8, May 27–30, 2013.

Originally published online: Kostin N. O. “Environmental thinking and environmental behavior.” *Philosophy and the humanities in the information society* 2 (2020): 47-55. URL: <http://fikio.ru/?p=3990>.

Antifa Straight Edge: A Manifesto (2001)

By XsaraqaelX

The Antifa Straight Edge believes in a sXe-lifestyle of abstaining from intoxicants as an actual and symbolic mode of promoting a life of responsibility, awareness, and independence through regaining self-control and shunning dependency on the political, social, and economic powers of a capitalist society. It furthermore supports like-minded social action based on this self-control, mainly in the fields of women and minority rights, social justice, animal rights, and environmentalism.

The Antifa Straight Edge does not, however, believe in a sXe-lifestyle as a necessary basis for antifascism. It does not judge people by their personal habits, but relates to them according to their general moral conduct. It also does not evaluate people's habits without taking cultural and social circumstances into consideration. In fact, the Antifa Straight Edge respects and even encourages a diversity of lifestyles as an essential aspect of creative antifascist communities.

Furthermore, the Antifa Straight Edge fully and uncompromisingly supports a woman's right to choose, a person's right to engage in homosexual practices, and the priority of social issues over animal rights or environmental protection.

Finally, the Antifa Straight Edge does not believe in forcing anybody into, or punishing anybody for a certain lifestyle, especially not by violent means. The Antifa Straight Edge commits itself to modesty, open-mindedness, and tolerance, and considers the use of militant resistance only where antifascist values, such as self-determination or social and economic justice, are under immediate and obvious threat. Generally, the Antifa Straight Edge acts by example alone. Militant action is a last resort, and its use must follow strict notions of sensitivity, responsibility, and measure.

Fight the Power!

[Author's note to "Antifa Straight Edge"]: I'm just about to turn 27, and I've been straight edge for over a decade. I've been feeling alienated from the scene for quite a few years now, mainly due to well-known developments commonly referred to as Hardline¹²⁹ and/or Christian Straight Edge¹³⁰ (I'm aware of the differences between and within the two, but to get a message across I will admittedly focus on the similarities here which mainly consist of promoting conservative—to say the least—ethics and politics). At first, my reaction pretty much was to retreat. It was kinda like, well, a new generation of kids is taking over, what can I do? But recently, the idiotic and highly irritating militancy of many straight edgers seems to get totally out of control, and I feel that it might be worth to clarify at least a few things about sXe.

Having said that, this is not about a revival of the "original" or "true" meaning of sXe, not about some "old" versus some "new" school, an "alternative" interpretation of straight edge's ideas, or an attempt to reclaim the scene for people like myself. Terms (and movements signified by them) are never fixed and clearly defined, they're always dynamic, open to different interpretations, and hence changes. I can't (and don't want to) forbid other people to call themselves straight edge, to X-up, wear sXe-shirts, or listen to Youth of Today, as much as I might disagree with their attitudes, beliefs, and actions. There's no universal criterion for defining what sXe really means, and I'm the last person who'd wanna do such a thing.

So, what is this all about then? Basically, just about a clarification that being straight edge doesn't necessarily mean you are a violent semi-fascist gay-bashing macho dick, maybe even with an obscure obsession with an oppressive, patriarchal religion. In fact, being straight edge can mean quite the opposite: it can be all about trying to be involved in antifascist politics. So, the Antifa Straight Edge will try to explain how to be straight edge in this sense.

What motivates me to do this if not - as dismissed above - "reclaiming" or "purifying" the term?

1. To remind antifascist straight edgers out there that there are still other like-minded spirits within (or at least at the fringes) of the scene.
2. To remind the militants that there is still disapproval of and resistance against their "war" within straight-edge ranks themselves.
3. To allow non-sXedgers a wider understanding of sXe, so they might not have to disrespect it immediately just because at the moment it experiences unfortunate and disturbingly strong trends of stupidity.

Supporting antifascist politics to me means fighting for anti-authoritarian, self-determined and economically just communities in which a diversity of people can coexist in solidarity, mutual respect, and peace.

Straight edge to me means an attempt to develop certain personal virtues that might prove beneficial in the fight for antifascist communities, namely responsibility, awareness, and independence.

¹²⁹ See Phoenix X Eeyore, *Total Revolution? An Outsider History of Hardline*, Archive.org/Warcry Communications, 2022.

¹³⁰ Ibrahim Abraham and Francis Stewart. "Desacralizing Salvation in Straight Edge Christianity and Holistic Spirituality." *International Journal for the Study of New Religions* 5, no. 1 (2014): 77-102.

It seems practically impossible to establish, maintain, or defend antifascist communities without the individuals constituting it taking on responsibility, since the whole point behind the idea of such communities appears to be that we don't need leaders, or people who tell us what to do, because we take on the responsibility to think, decide, and act for ourselves.

Awareness seems like an inevitable quality in this respect. It's hard to act responsibly in a community if we don't know shit about what's going on.

And awareness seems hard to be developed without at least a certain sense of independence, meaning: to be able to find and figure out for ourselves what's going on and not depend on some big brother's indoctrination.

Based on these thoughts abstaining from intoxicants (and that's all sXe originally meant) can make sense to certain individuals: A lot of intoxicants lower your levels of awareness and responsibility pretty much right after consumption. Others may contribute to a rather phlegmatic personality in the long run. And some might cause serious addiction, often leaving individuals completely detached from any community. So, if one values being responsible, aware and independent, it might be understandable to choose sobriety over the consumption of intoxicants.

Another aspect to consider is that the consumption of especially alcohol and cigarettes usually supports big corporations that stand against the idea of economic justice and participate in turning individuals into consumerist slaves (maybe the most widespread form of capitalist control today denying us true individual independence).

Combining these aspects we can see that abstaining from intoxicants has a symbolic significance that goes beyond simply abstaining from intoxicants. It's a statement for being unwilling to let others control your life: not just drugs, but corporations, politicians, cops, your parents, whatever gets in the way of your self-determined way of doing things. It's a statement of taking your life into your own hands. It's a statement for uncompromising DIY-ethics, in the original spirit of DIY-Punk and -Hardcore. And in this sense it might very well be seen as a revolutionary statement, being about consciousness, fighting the system, liberation, determining your own destiny. On this basis all the social movements and activities a lot of straight edgers have participated in over the years could grow strong because they were strongly grounded: homeless-support, minority-support, vegetarianism/veganism, environmentalism, to name but the most obvious few. It is in this sense that I can see straight edge to be part of an antifascist movement, and I know that this is what sXe has always been about to many individuals involved in the scene.

But this also means that sXe is nothing but a lifestyle. It is not an ideology. There are no natural moral laws against drinking wine or lighting a pipe. I happily leave such arguments to totalitarian and oppressive political and/or religious schools of thought. If I didn't wanna drink for such reasons I'd become a Seventh Day Adventist or something. I don't abstain from drinking 'cause god or the universe or whatever tells me not to; not because it's inherently evil or sinful; not because we're not meant to drink or alcohol is no natural food source. I don't drink (or smoke dope, etc.), because I personally don't want to. It seems to interfere with my abilities to promote antifascism.

Seen this way, being sXe is purely pragmatic. I'm sXe, because I think it helps me being an antifascist and allows me to make an antifascist statement, and because of no

other reason. If I felt being sXe wouldn't support antifascist action, I wouldn't give a shit about it.

This has, I think, some important implications, especially in the light of ongoing developments within the sXe-scene:

1. It's a personal decision. I do think that being sXe generally provides a good basis for an antifascist lifestyle, but neither does it automatically make you an antifascist (as, unfortunately, we have to witness today), nor is it the only way to be an antifascist (which seems so obvious I almost feel silly to point it out, but sometimes it seems one has to make the most trivial things explicit). In simple terms: There are lots of great and decent individuals/antifascists who are absolutely not sXe - and who am I to question these people's personal lifestyles?

2. Straight edge was born out of a mainly white middle-class US-American movement, namely Hardcore; therefore it is the result of a specific time and place and social setting, and therefore its negative reaction to intoxicants is a result of a specific socio-historical condition. In other words: We are not too fond of intoxicants, because our society uses them in a shitty way, and they started to destroy our Punk- and Hardcore-scenes. This, however, does not mean that intoxicants can't function differently under different cultural circumstances. I'd find it embarrassingly pretentious to disrespect, for example, the use of peyote in many Native American nations, or of ganja in the Rastafarian community. There are different worlds with different rules.

3. Nobody is ever "wrong" or "bad" because of not being sXe. We might not like it, or we might want to confront people who do shitty things under the influence of intoxicants, but the actual consumption itself doesn't mean shit, and we have no right whatsoever to judge people who like to smoke or drink or shoot up.

Unfortunately, many kids today don't see sXe this way. They don't understand it as pragmatic, modest, and tolerant. They understand it as an ideology, a law, a true way of life, a universal moral code. You are sXe, you are good - you are not, you are bad. People are divided into different moral categories depending on whether they drink beer or fruit juice, whether they smoke a joint or chew licorice, whether they eat their muesli with dairy or soy. This is a fascist mentality. Pure and simple. An ideology with its claim to exclusive truth and righteousness is by definition an antifascist's enemy. Whether it's Catholicism, capitalism, or straight edge. Straight up: If I get in a situation where some fucked up sXe-kids in Salt Lake City (or anywhere else for that matter) start a fight with some dope-smoking kids for no other reason than them smoking dope, I wouldn't hesitate a second to join the ranks of the latter, who are, in this case, nothing but innocent victims of a bunch of fascist hooligans.

But it's not only the scary self-righteousness, intolerance and militancy that sXe as an ideology breeds. It's also that its ideas become repulsively narrow-minded: instead of understanding the complexities of global food production and distribution, nutrition, ecological balance, and social divisions, they become idiotic vegan fanatics; instead of considering the patriarchal character of our societies, they become anti-abortion; instead

of embracing diversity as an intrinsic social value, they become homophobic; instead of seeing the interrelations between environmental destruction and economic injustice, they become eurocentric racists in deep-ecological colors; instead of being committed to antifascism, they hype bands like Vegan Reich; instead of holding up the tradition of innocent early sXe self-defense with shirts like “It’s OK not to drink”, they sport martial “True till the end”-bullshit; instead of generally being socially and politically aware, they reproduce US-American middle-class family values; instead of being progressive, they revive Christianity in its most conservative and frightening forms; and instead of being modest, decent, and peaceful, they become arrogant, intolerant, and violent. It’s a sad affair.

Anyhow, this text probably won’t change any of that. I’m too aware of the little impact my humble self can have. Nevertheless, I want people to know that there’s still a different X out here. One that does not represent ideological (and, by now, physical) terror and sectarianism, but pragmatic antifascist politics. (2001)

Originally published on: https://www.alpineanarchist.org/r_antifa_straight_edge.html

Codependency Is a Toxic Myth in Addiction Recovery

by Maia Szalavitz

With over seven million copies sold, Melody Beattie's 1986 best seller, *Codependent No More: How to Stop Controlling Others and Start Caring for Yourself*, is considered a self-help classic and continues to sell well in a new 2022 edition.

The book popularized the idea that partners and parents of people with addiction have their own disease: codependence, which causes them to act as “enablers,” contributing to their loved ones’ continued use of substances. Like a drug, the relationship and its drama helps distract codependents from their own problems and so they resist change.

The concept has penetrated American culture. The word itself frequently appears in media and pop culture. TikTok videos on codependent relationships have hundreds of millions of views. And therapists and rehabs teach about it, as if it is a genuine psychological phenomenon.

But the influence that the concept of codependency has had on addiction treatment and policy has been toxic — and its tenets are not supported by data.

Codependence has long been part of the dominant addiction treatment philosophy in the United States, which is based on the 12 steps of Alcoholics Anonymous. In this approach, people with addiction are taught that they have a disease and that recovery requires surrender to a “higher power,” moral inventory, making amends for wrongs done and attending meetings. (Although its influence has declined slightly, around two-thirds of addiction treatment facilities are still 12-step focused.)

Lois Wilson, wife of A.A. co-founder Bill Wilson, helped found Al-Anon in 1951 to support wives and other family members of A.A. members. The idea that relatives of addicted people have their own disease first took root here. In 1976, Ms. Beattie, then an addiction counselor, created a new therapy group to help them. Before long, family members were being taught that “tough love” was the only way to manage addiction. Being kind was enabling, and for everyone to recover, parents and partners needed to back off.

As cocaine addiction rose in the 1980s, the concept of codependence offered a path to support and treatment. By the mid-1990s, treating it was an established part of therapy and residential facilities sprang up that specialized in it. A new 12-step group, Codependents Anonymous, formed in 1986.

Soon, codependence became a household word, with publications musing on whether America was codependently enabling President Bill Clinton’s sex addiction. Its ideology about using tough love to fight addiction settled into conventional wisdom.

There is little evidence, however, that codependence actually exists. The diagnosis was rejected by psychiatry’s diagnostic manual, The Diagnostic and Statistical Manual of

Mental Disorders, or D.S.M. And unfortunately, what the concept actually enables is harmful treatment.

Codependence doesn't make the grade as a psychiatric disorder for many reasons. For one, there's no accepted way to measure it. Other diagnoses better integrate personality traits like being controlling and overly self-sacrificing that are sometimes ascribed to codependency. Moreover, feminists have long noted that the idea itself maligns caring — and by extension, women — by blaming people for their partners' addiction and failing to recognize that women may “enable” their partners because they need their economic support.

Parents have even described being labeled sick because they refused to leave their kids homeless or have them arrested, even though both situations can worsen addiction. When someone is ill with any other disorder, relatives are not shamed for obsessively caring or rearranging their lives to help. Instead, those who abandon suffering loved ones are stigmatized. But when it comes to addiction, parents are told that their loving kindness is pathological because they somehow benefit psychologically from keeping their children addicted. Only letting them hit rock bottom will allow recovery, the thinking goes.

When one mother, Susan Ousterman, tried to comfort her son by sending him care packages in rehab, she was told by addiction counselors and others that she was “going to love him to death.” Detach and let him hit bottom, she said they insisted. Her son, Tyler Cordeiro, died of an opioid overdose in 2020 at age 24.

“The tough love narrative taught to parents was absolutely a factor in his death,” she said, describing how being rejected by his family left him hopeless and demoralized. These days, she spends her time advising other parents to think differently.

Policymakers and professionals would do well to follow her lead. Research does not support the idea that families of people with addiction have a unique syndrome that drives them to enable it. Worse, concern about enabling is frequently used to bolster counterproductive tactics like arrest and incarceration, and stymie compassionate, proven harm-reduction strategies like medication treatment and syringe service programs.

Even the idea of “enabling” is poorly defined. Haranguing people to quit is viewed as enabling, because it sustains a dysfunctional cycle: He nags, so she drinks; she drinks, so he nags. But being supportive, particularly financially, is also suspect because it might prevent someone from “bottoming out.” The only way codependent people can be sure they aren't enabling is by leaving, proponents argue.

“It just pathologizes relationships when what we need to be doing is helping people see the power in our relationships,” said Carrie Wilkens, a psychologist and co-author of a forthcoming book on how families can compassionately promote recovery. “People do not need to hit bottom to change. People change at all of the steps before they get to bottom, and bottom for many means death.”

Psychologists now recognize that needing others is normal: Human brains and bodies rely on social contact to soothe stress and we become dysfunctional without warm relationships. Basically, everyone is codependent. And the last thing atomized America needs is more reinforcement of the idea that individuals alone determine their happiness.

The main problem in addiction isn't needing someone or some drug to function; many people rely on medications and relationships without being addicted. Instead, the

core of addiction is compulsive behavior regardless of harm, which is why the D.S.M. no longer labels addiction as “dependence.”

The success of strategies commonly seen as enabling drug use by the state — providing clean needles, safe spaces to take drugs, housing that doesn’t require abstinence, and even prescribing heroin — also undermines its central claim.

Research shows that people who engage with these types of programs are often as or more likely to seek abstinence or more traditional medications, or are otherwise healthier, compared with those who don’t.

Research also shows that people with resources and social connections are more likely to recover from addiction than those who are at the bottom and have nothing.

None of this is to say that people with addiction can’t have destructive relationships or that being too dependent can’t be problematic. But such issues are not unique to addiction.

Families should not tolerate stealing or other abusive behavior. People need to protect themselves and other children, and that may involve cutting contact with addicted loved ones. Setting firm boundaries can keep relationships healthy. But it shouldn’t be done based on the false idea that getting tough is the only way to spur recovery.

Dr. Wilkens and others who use evidence-based therapies — like CRAFT and motivational enhancement, which use gentler tactics and do not pathologize caring relationships — want families to know that there is hope. “Studies show time and again that families are the biggest reason why people want to change and do change over time,” she said.

Originally published in *The New York Times*, “Codependency Is a Toxic Myth in Addiction Recovery,” 8 July 2022. <https://www.nytimes.com/2022/07/08/opinion/codependency-addiction-recovery.html>

Maia Szalavitz also authored *Undoing Drugs: The Untold Story of Harm Reduction and the Future of Addiction*.

Weaponizing Sobriety: Feral Anarchy Against Intoxication Culture

by Blitz Molotov

“We were induced to drink, I among the rest, and when the holidays were over we all staggered up from our filth and wallowing, took a long breath, and went away to our various fields of work, feeling, upon the whole, rather glad to go from that which our masters had artfully deceived us into the belief was freedom, back again to the arms of slavery. It was not what we had taken it to be, nor what it would have been, had it not been abused by us. It was about as well to be a slave to master, as to be a slave to whisky and rum. When the slave was drunk the slaveholder had no fear that he would plan an insurrection, or that he would escape to the North. It was the sober, thoughtful slave who was dangerous and needed the vigilance of his master to keep him a slave.”

-Frederick Douglass

“It is not a new idea that we who live in mass technological society suffer psychological addiction to specific machines like cars, telephones, and computers, and even to technology itself. But the picture is bigger and more complex.”

- Chellis Glendinning “Technological Addiction”

“What I am describing is a human-constructed, technology-centered social system built on principles of standardization, efficiency, linearity, and fragmentation, like an assembly line that fulfills production quotas but cares nothing for the people who operate it. Within this system, technology influences society. The automotive industry completely reorganized American society in the twentieth century. Likewise, nuclear weapons define global politics. At the same time, society reflects the technological ethos. The social organization of workplaces, as well as their architecture, reflects the mechanistic principles of standardization, efficiency, and production quotas.”

- Chellis Glendinning “Technological Addiction”

Intoxication culture provides a normalized social environment for toxic escape. This specific form of escapism centers substance abuse and inebriation as preferred methods of emotional stress relief. As the misery of wage slavery and the monotony of industrial society create a desire for temporary escape, addiction is exploited for capital gain. This profit motive manufactures a landscape of encouragement (whether through corporate advertising or social tradition) which reinforces intoxication culture as a societal norm.

I have seen how intoxication culture expands its sphere of influence with the help of peer pressure and the propagation of intoxication as a pleasurable social activity. The

realities of addiction and death are often concealed behind the facade of glorification or dismissed as mere “extreme cases”. Besides, the interconnected network of drug overdose, nicotine addiction, and alcoholism make bad selling points. For those who profit most from products that yield higher addiction rates, intoxication culture is a grocery store of profit with a variety of items and brand names. Its membership is both proliferated by a desire to escape and encouraged as a form of positive social activity. And because intoxication culture exists in society as a socially dominating force, social isolation becomes a penalty for many who remain sober. Evidence of this can be seen with how common intoxication culture is, and how very few sober support networks exist, within the anarchist milieu. This makes socializing more difficult for anarchists who are personally fighting addiction, who then relapse due to inadequate sober support from friends and the social environment. Those attempting to overcome addiction often find themselves choosing between a socialized relapse or an isolated recovery.

As an anarchist, I recognize the relationship between capitalism, intoxication culture, and the state—which merely exists as an agency seeking regulation and domination rather than elimination. The “War on Drugs” proves nothing more than an excuse to racially target individuals for incarceration. Intoxication culture often becomes a primary weapon for dismantling movements while systemically serving as a form of social control and distraction. Capitalism requires total subjugation of mass society, beginning with the individual. On an individual level this includes—but is not limited to—internalized inferiority, self-destruction, and disempowerment.

It is for these reasons that I remain sober as an individual form of negation to the social order of intoxication. As an anarchist, I view straight edge as a weapon against the state’s attempt to ensnare me in a trap of distraction and toxic self-destruction. My sobriety means anti-capitalist: a molotov thrown at a passing police car, a fire that engulfs a business district, a riot beyond measure.

My straight edge is anarchistic at the individual level of reclaiming and weaponizing my mind and body. This includes my ability to communicate without the mediation of inebriation or altered states. I want to explore social interactions which flower and defy the obstacles of social anxiety without the politician-like mediator of intoxication. In sobriety the fear that holds raw emotion hostage is a fear socially conditioned by social disconnection and civilized alienation. For many different reasons contextual to each individual, most people are shy when first meeting or interacting. But this allows for a process of trust-building and bonding—both of which are shortened or eliminated when mind-altering substances are present. Intoxication then becomes the mediator of social interactions, often misrepresenting the (sober) interests of individuals, and in many cases becoming a tool for manipulation.

Social lubricants like alcohol or other mind-altering substances provide a temporary release of tension and feelings from the captivity of emotional repression. A distorted sense of freedom follows this release; freedom is conceived through one’s choice to consume mind-altering substances in addition to one’s freedom to purchase them. Under capitalism, access to alcohol for example is determined by age. Age becomes a numeric identifier of privilege; a distinguisher between those who have the freedom to purchase and consume it and those who legally do not. This materializes a hierarchy which privileges those legally recognized as “adults” with the right to purchase and consume alcohol. Those who do not meet the age requirement are burdened with the social mockery of being “too young” and therefore viewed as lesser in a capitalist society dominated by the social construction of “adulthood”. This hierarchy provides the social

and psychological encouragement necessary for maintaining business with future buyers; in theory, the same youth who eventually enter adulthood.

My straight edge anarchy is positioned against the assumed legitimacy of intoxication culture as a marker of age-based social value. In youth there is anarchy in the courageous act of becoming an individual undefined by intoxication culture. For the youth who refuse to assimilate under peer pressure, there is anarchy in the fire set to the hierarchy of social values determined by intoxication culture. Anarchy begins with the individual; the individualist choice to conform to or defy a culture. Straight edge is the individualist negation of intoxication culture, positioning itself against a society of peer pressure which aids capitalism in its quest to profit from addiction and substance use. From this perspective, my straight edge is a youth-based refusal to assimilate into an adulthood defined by the legal right to consume intoxicants. From an anarchist point of view, straight edge is individualist rebellion ungoverned by intoxication culture.

Like the plastic and technological devices that captivate us with high-tech addiction, intoxication culture infuses addiction with death. The numbing effects of artificial reality distracting us with illuminated screens resemble the drugs that produce temporary artificial realities and perceptions to which we lose ourselves. The ecological destruction caused by the extraction of raw materials to uphold the techno-industrial society parallels the depletion of soil nutrients and chemical use of pesticides, fertilizers and growth regulators for tobacco agriculture. The death of ecosystems is the result of accommodating a popular demand motivated by addiction—whether through deforestation, mining, extracting, refining, and purifying metals or oil for technological devices, or through heavy energy/water consumption, solid/water waste pollution, by-products, and toxic emissions for brewing alcohol.

The surrendering of individuality to the homogeny of mass technological consumerism shares another commonality with intoxication culture: peer pressure. For example, in order to remain in communication within a general populated social circle, certain technological devices must be purchased and utilized. Without them, individuals are burdened with social isolation. Capitalists require mass participation in order to profit from the products sold—whether that be products related to intoxication culture or products related to technology. The technological-industrial society which conditions our fixation on plastics and high-tech devices interconnects with the totality of a capitalist quest for marketing addiction. From this perspective, straight edge anarchy for me is a wildness hostile to the pacifying qualities of technological addiction, intoxication, and substance abuse. My anarchy is a feral rejection of a deadening capitalist society in which life is converted to a culture of spectacles and high-def imagery commodified for consumption. I refuse to be subdued by the appeal of new gadgets and intoxication—both which socially engineer the hierarchies of class status and popularity. Rather than finding raw life in mere temporary moments of escape, I prefer raw life found in permanent rebellion—the destruction of the material capitalist world of misery that creates the desire for toxic and technological escapism.

As an anarchist, I refuse to tranquilize the chaos of my *jouissance* with inebriation. I exalt life vehemently against the pacifying qualities of marijuana, the cancerous addiction of tobacco, and the “correctional” anesthesia of psychiatric medications. The intoxication-based realities of poverty, addiction, and death motivate my personal desire to remain sober and supportive of those struggling. As long as I exist, my sobriety remains a weapon against capitalism, a weapon which can not be confiscated

by the social conformity essential to intoxication culture. Towards individualist revolt and a straight edge anarchist praxis, straight edge means *attack*.

Previously published elsewhere such as in: Kuhn, Gabriel. *X: Straight Edge and Radical Sobriety*. Oakland, CA: PM Press (2019); and Molotov, Blitz. "Weaponizing Sobriety: Feral Anarchy Against Intoxication Culture." Warzone Distro (2018). https://warzonedistro.noblogs.org/files/2018/10/Weaponizing-Sobriety_Feral-Anarchy-Against-Intoxication-Culture.pdf

On Animal Experimentation, Drugs, and Liberators

By Screaming Wolf

Who are the liberators? What events have transformed these compassionate animal defenders into terrorists?

Liberators believe that a human has a no greater claim to life than a mole or a sea bass. They feel that humans are the lowest form of life, and that the world would be a much better, more peaceful place without them. If you agree with this position, then you will love this book.

If you believe that humans are the chosen species or the highest point of biological evolution, and that this somehow gives them a right to abuse other creatures, then this book is important to you, too. It will let you know that you are a target for animal liberators. Every time you abuse another creature, look over your shoulder. Through liberators, the animals are now fighting back.

There are some of you who locate yourselves between these extreme positions. You believe that animals should be treated well, but you still place humans on a throne. Conflicted by your empathy for other creatures and your need for control, you play the moderate. You try cooling down extremist animal defenders, calling for non-violence and dialogue, and you try increasing the sensitivity of animal abusers, calling for larger cages and “humane slaughter”. You will find this book disturbing. According to liberators, there is no room for moderation and compromise when it comes to moral principles concerning life and death. And liberators are concerned with life and death.

[...] Liberators, after all, are human. Humans have a great capacity for fooling themselves. We feel one way, but think another. We feel that animals should be free to live their own lives, but we think that such freedom would unreasonably conflict with our lifestyles. We like drugs, and meat, and other products of animal exploitation, but we feel sick when we learn exactly what happens to the animals during the production of such products. That’s why slaughter houses are out of public view, and research lab doors are kept closed. It helps people keep their heads in the sand, closing their eyes to all the cruelty around them.

Some people turn off their feelings to suffering animals, and fabricate ideas to justify their acts of animal abuse. Society supports this, since it values thoughts over feelings. These people learn to suppress what they really feel when they see animals suffering. Separating thoughts from feelings is a part of the process of alienation that plagues humankind.

Because if this alienation, most people have no sense of where they belong in the world, or who they themselves really are. Pop psychology and self-help books overflow on the shelves of bookstores, as these confused, frightened, and lonely people seek help from pieces of paper, hoping to put some meaning and love in their lives. But it takes more than words to change people’s lives and re-integrate alienated humans into a

balanced, natural world. Despite the encouraging writings of self-appointed gurus, their abuse of animals, and of themselves, continues. These people never become liberators.

The people who do become liberators examine personal feelings and thoughts, and discard ideas that don't fit the world in which they want to live. They realize that ideas are no more than justifications of feelings. Getting in touch with their feelings helps them avoid the alienation that leads to so much human pain and suffering. As they keep in touch with their feelings, they abandon animal abuse, and transform their way of life into a more compassionate one.

They then join support groups. They join out of a sense of helplessness and a growing need to do something, to change the world. They sometimes fight with old friends who still support animal research or hunting, while trying to find new friends. Meanwhile, they adopt a vegetarian lifestyle, since they don't believe in eating their non-human friends. This makes them social pariahs, and even their families can't wait until they get through this new "phase" that they are in.

After a few years, the "phase" is considered an unhealthy obsession. They are taking this animal issue to extremes, they are told. Nobody likes extremists. Extremists take their beliefs seriously and practice them consistently. Most people are frightened by consistency. It takes too much work. As a result, friends are not as easy to locate as before. The problem is that they begin to feel comfortable only with other animal "extremists," and such people tend to like animals more than they like people.

There is a reason why people who become liberators turn to animals for affection. There is an honesty about non-humans. They don't play games. They are direct. And they are never intentionally cruel.

[...]

So long as people change their behaviors for personal gain, rather than for ethical reasons, there is always the possibility that they will change again, listening to the next salesman of health and beauty. The meat and medical industries know this. Liberators feel that is why these industries are fighting back to maintain animal abuse. They use the message that lean meat is good and essential for health. They know that health minded people will eat flesh again if told it is good for them.

And they are successful in pushing their message. Witness how many "vegetarian" people revert to a meat-based diet for fear of protein or calcium deficiency. Most vegetarians strike a bargain, hoping to get the best of both camps' advice, by eating dairy products and eggs. Is this really a victory for the animal movement, liberators ask?

As another example, consider the cruelty free shoe market. Stores like Payless Shoe Stores offer plastic and canvas shoes. Non-violent animal lovers are quick to claim this as a success of their approach. But, liberators ask, how many people in the movement still wear leather and put fashion before ethics? Is the success of stores like Payless due to the support of animal lovers shunning leather? Or is it that plastic and canvas shoes are cheaper than leather ones? Liberators feel people today are attracted to low cost merchandise. Payless and others stores like it appeal to budget minded people. That's why it's called "Payless" and not "Cruelless". Does that qualify the stores' increased popularity as a victory for the animals, liberators wonder?

On the other hand, liberators state, little has changed in the area of animal research. If anything, things have gotten worse. The creation of genetic engineering techniques

have opened up new avenues for animal exploitation. Strains of mice can now be produced, and are being patented with certain genetic derangements. The biomedical carnage against animals has continued unabated, except for some increased paperwork that vivisectors must complete. Liberators point out that, despite the growing awareness of such abuses, however, animal lovers still flock to physicians who are trained by bloodthirsty vivisectors, and buy drugs which were tested on animals.

Another failure of non-violent movement raised by liberators is the hunting situation. According to liberators, virtually nothing significant for animals has been achieved over the past decade when it comes to hunting. In fact, there are now hunter harassment laws preventing animal supporters from going into the woods and interfering with the killing.

Why have vivisection and hunting been resistant to progress, while other areas have been more flexible to change? To liberators, the answer is simple. Consumers have an effect on the balance sheet of consumer oriented companies, like restaurants and cosmetic manufacturers. It is no skin off of their noses to add a cruelty free item to their list of products, as when [corporate fast food chain] sells vegeb主rgers along with its [hamburgers].

However, the drug and medical industries know that people will consume their products regardless of animal testing. As discussed above, when people are in pain, their morals often go out the window.

[...] Both over the counter and prescription drugs are developed and tested on animals. The drug industry is a multi-billion dollar enterprise, and tens of millions of animals are killed each year to develop new agents. The bio-medical research industry is intimately associated with the drug world, and kills 100 million animals each year. Not all of these drugs are for direct human consumption. One half of all antibiotics produced are fed to animals destined for slaughter, to minimize the deleterious effects of factory farming on their growth and development. Human beings, of course, consume these drugs indirectly, as they consume the animals' flesh.

[...] It is clear to liberators that non-violence will not work for the animal liberation movement. Yet, people still insist on its use. Why do people hold onto non-violence as a tactic when it is so clearly inappropriate?

Liberators ask that you face the truth. In their assessment, most people are cowards. They are comfortable sitting on their fat sofas, sipping beers, and watching football games on television. If a person likes dogs or cats, he may give twenty bucks to some animal group, particularly one that sends pictures of dogs and cats being experimented on. It's easy for some people to disagree with animal research. They don't have to change their behaviors, like the food they eat, or the fact that they drive through the living rooms of animals each day. Of course, they still want their prescription drugs when they are sick, even if the drug company does test them on animals.

[...] Some of you may be agreeing with the liberators' assessment of human nature, society, and the inadequacy and inappropriateness of non-violent resistance for the liberation movement. You feel connected, as they do, to other beings in our family of creatures. You feel you must do something to defend your family. But the methods of liberation, withdrawing from society or staying marginally in society to engage in militant interventionism, are too difficult for you to fully practice at this time, even though you agree with them in principle. You don't want to be part of the problem, but

you can't yet see yourself as part of the liberator solution, which is waging war with humans and their society. What do the liberators say you can do?

This is a good time to ask a difficult question. If liberators believe that humans are irrational, inconsistent, cruel, near-sighted, greedy, barbarous, alienated from themselves and nature, and covered from head to toe with the blood of innocent beings, what makes liberators believe that they are an exception?

The fact is, liberators recognize that they are no different. They, too, are human, and accept that they suffer from the human condition. They see themselves as products of society, social creatures who are an integration of culture and nature. But it is not a black and white situation. When it comes to assessing one's involvement in human cruelty and the bloodshed it causes, liberators believe there are many shades of red.

As the liberators see it, the hunter who seeks out life to kill is deeply red. So is the researcher, and the drug manufacturer, and the slaughter house worker, the trapper and the furrier, and the fisherman, and the breeder, and the pet shop owner, and the highway driver. The list is as long as there are people in society. Everyone who participates in the cruelty of society bears the stigma of its bloodletting.

Clearly, as far as the liberators are concerned, a vegan who doesn't drive, makes so little money that she pays no income taxes, and spends her time rescuing animals from local farms is a lighter shade of red than an animal researcher who hunts on weekends, eats meat, and pays thousands in taxes to support the killing machine.

When you chose to participate in society, even to liberate animals through militant interventionism, you are a shade of red. Even withdrawing from society does not cleanse you of redness. Withdrawal is a matter of degree. When you withdraw you take with you something from the cruel society, whether it be supplies or information. As a cultural animal, society is with you wherever you go. It affects the way you act, think and feel.

On a more tangible note, liberators point out that when you withdraw from society you are going to be living on somebody's land. If it is your own, you will have to pay taxes on it. If it is forest service or private land, you will probably have to deal with officials. The days of Walden Pond, where Thoreau left civilization, are over. In fact, Walden Pond is now a State run facility, and you have to pay a few bucks to go to its beach.

The fact that perfection is difficult to achieve, however, does not mean that it should be discarded as a goal. Liberators criticized Gandhi for relying on super-human Satyagrahis for his non-violent revolution. It could be argued that they, too, are demanding super-human dedication, clarity and commitment to be a liberator. But they realize that few people can be committed to a consistent moral position and make the types of deep sacrifices they are recommending.

Liberators suggest that we be realistic. Most people, even the most committed ones, are going to have difficulty withdrawing from society to the greatest extent possible. Few people will take their children out of school and leave for the forest to be self-sufficient survivalists, even though such a life would be more natural and healthy, not to mention more ethical.

But, as liberators see it, this is the beginning of the liberation movement. As the few people who are willing to make a sacrifice of their material and social comforts leave for

the wilderness, small communities will form. It will become progressively easier for people to leave society as these communities develop.

The fact is, people need other people. We are social beings. Yet, because of our sensitivities to non- humans, we feel disgusted and alienated from others who blindly practice the culture of cruelty. Many people feel, as liberators do, like aliens from another planet whenever they are out in society.

There are times when we feel like we have stepped out of reality and into the Twilight Zone, as when we go to shopping centers and see them filled with blank-faced, mindless consumers, or when we see restaurants lining the city streets selling the flesh of slaughtered creatures. The fact that people can live in urban settings, with traffic jams, pollution, overcrowding, rampant consumerism, and the total destruction of the natural environment and its replacement with asphalt and high rise buildings, is testimony to human alienation from nature. Humans are even alienated from their own natures as animals. We wonder how people can live such a life. As we reflect on this insanity, we feel alone in the world – like millions of other people!

Because of our social natures, however, our distaste for other people and our alienation from them and their culture does not stop us from feeling a need to be among them to some extent. How do liberators resolve this ambivalence?

They realize that they are not alone in their alienation from the insanity of others. Even now, communities exist in the forests and mountains where people have withdrawn from society to the greatest extent possible and live a natural life among other like-minded souls. They have discovered that they did not need to sacrifice their sensibilities for human companionship.

In truth, such a sacrifice is useless. When we give up our sensibilities to be with alien people, we become alienated from ourselves, and lose all chances of finding fulfilling companionship. Remember, the basis for enjoying others is the ability to find empathy with them. You can't empathize with aliens, because, by definition, aliens are those with whom you do not identify, and identification is the basis of empathy. You are only wasting your time with people whom you cannot relate to.

Let me illustrate this dilemma with a common example. As a vegan, you feel anxious every time your family invites you over for Thanksgiving. You know that a member of your wider family, a turkey, will be slaughtered, disemboweled, beheaded, plucked, cooked, and eaten for this occasion, and you want no part of it. To make you happy, the hosts have made some vegetables for you to eat. They expect you to be content sitting with them as they devour the turkey, as long as you can eat your vegetables. They expect you to respect their behaviors as long as they respect yours.

Some people submit themselves to this abuse each year in the name of civility, friendship, or family loyalty. Of course, as far as the turkey is concerned, you are not being civil, friendly, or loyal. To liberators, it is all human-centered bullshit!

Other people have declined such invitations, choosing to feel lonely rather than disgusted.

Still others have realized that there are other vegans with the same feelings of alienation who would love to get together. There is nothing so wonderful as eating a vegan meal with other vegans, when you finally feel a connection to other humans. Such

community feeling is happening in the liberation movement, even in the wilderness. Liberators suggest you keep your eyes and ears open for others with like mind.

Liberators, then, believe that people can withdraw from society without having to miss quality human companionship. It's just a matter of finding the right, like-minded people. As for militant interventionism, liberators suggest that people who currently decide to stay within society can capitalize on their situation and become saboteurs. A committed individual can lower his or her standard of living in order to consume as little as possible, can drive as seldom as possible, and can eat a vegan diet. This will lighten their shade of red. As far as liberators are concerned, acts of militant interventionism, from a brick through a pet store window and the liberation of animals, to the slashing of animal transport vehicle tires, will lighten their shade even further.

Two people who read this book and agree with its principles can work together, recommend liberators. One can work as an infiltrator in a lab, or a slaughter house, or a grocery store, and feed the other information for militant intervention. If someone makes more money than they need, liberators suggest that they can support someone else who wants to spend all of his or her time in sabotage.

What liberators believe this shows is that people can participate in the liberation movement without needing to be perfect human beings. Realizing that we are not perfect is like realizing that we cannot change society. It makes no sense to lament what we cannot be; but we can find optimism and hope in realizing what we can become. Liberators hope we, too, can engage in animal liberation to the greatest degree possible, all the time trying to become more consistent, more militant, and further removed from society. According to liberators, we can all engage in the life long process of becoming a lighter shade of red.

Excerpts from Screaming Wolf, *A Declaration of War*, 1990. p. 6, 7, 24, 29, 45, 58-60.

Earth Crisis



Various song lyrics by the band Earth Crisis

Ecocide

*Silenced in the roar of the flames.
After the screams and the dying, nothing remains.
Desecrated, slashed, burned to the ground.
In the frenzy of greed, cries of protest are drowned.
The Earth dies —ecocide!
The Earth's forests laid forever to waste.
Thoughts of the future trampled in their haste.
Corporations with their dollar sign focus
ravage the amazon like a plague of locusts.
Plumes of black smoke ascend into the sky.
A forest of beautiful creatures senselessly dies.
Smoking fields of devastation left in mankind's wake.
With populations left to grow and greed, they justify this rape.
(The power of the dollar) can't take precedence
over the inevitable detrimental consequence.
The time to react is long overdue,
from protest to confrontation by me and by you.*

(from the EP: "All Out War," 1992) and the album: "Breed The Killers," 1998)

The Discipline

Straight edge—the discipline.

The key to self-liberation

is abstinence from the destructive escapism of intoxication.

I separate from the poison—a mindlessness I've always abhorred.

Usage will only increase the pain, a truth I constantly see ignored.

The pollutants that kill the body breed apathy within the mind.

The substances that once brought release in the end will always confine.

From drug-clouded lungs and veins motivation dissipates.

Imprisoned within addiction, abuse increases until death overtakes.

Enslaved by concupiscence, promiscuity leads to despair.

Victims used and abandoned by liars who professed to care.

Self-exiled from their insanity.

Striving to attain higher levels of purity.

The beauty in life is mine to know.

Amidst the ruin I survive. I've got to stay free.

Damage everywhere—infections at every turn.

Through my refusal to partake I saved myself.

Abstinence was the beginning.

What's important is what's done

with the freedom step by step I overcome.

Alone I climb the staircase to edification.

Deliverance—From birth an existence of agony begins that ends with execution.

Intentionally infected with diseases to then try to find cures for humans.

Fractured skulls, broken bones, scalded flesh and blinded eyes.

For medical research and cosmetic testing animals suffer and die.

*Walls conceal the tortured victims of vivisection.
Nothing of value can be gained for science or medicine
when the price is a helpless animal's life.
An animal becomes a subject—their pain a mere reaction.
Harmless testing alternatives ignored—they refuse to end their profit system.
The suffering benefits mankind—the excuse for demented scientists whose brutalization of
the innocent denigrates humanity's existence.
When education and peaceful protest can't bring their liberation
the strategy for their rescue changes into militant intervention.
Every action has an impact. Every life saved is a victory.
The truth known by the caring few who wage guerrilla warfare to end this atrocity.
Severed locks, doors wrenched from hinges,
the animals' deliverance from torment and captivity.
Vivisectionists dragged into the street and shot as flames engulf the laboratory. Justice's
hammer falls again and again until it ends
when the price is a helpless animal's life.*

(from the album "Destroy The Machines," 1995)

Drug Related Homicide

*The drug related homicide of a nation
as society is plagued by mass addiction.
The numbers culled eliminates competition.
Pulling others in as the caskets lower down.*

*Caustic chemicals open early graves.
Caustic chemicals open early graves.*

*The drug related homicide of a nation
as society is plagued by mass addiction.
The numbers culled eliminates competition.
Pulling others in as the caskets lower down.*

*Caustic chemicals open early graves.
Caustic chemicals open early graves.*

*Toxins used to numb, to tranquilize.
Those afflicted left institutionalized.*

*The drug related homicide of a nation
as society is plagued by mass addiction.
The numbers culled eliminates competition.*

Pulling others in as the caskets lower down.

(from the album: "Breed The Killers," 1998)

New Ethic

This is the new ethic.

Animals' lives are their own and must be given respect.

Reject the anthropocentric falsehood that maintains the oppressive hierarchy of mankind over the animals. It's time to set them free.

Their lives reduced to biomachines in the factory, farm and laboratory.

Dairy, eggs and meat, fur, suede, wool, leather are the end products of torture, confinement and murder.

I abjure their use out of reverence for all innocent life.

Wild lives' right to live in peace in their natural environment without this civilization's interference can no longer be denied.

Must no longer be denied.

To make a civilization worthy of the word civilized the cruelty must end, starting within or own lives.

Reject the anthropocentric falsehood that maintains the oppressive hierarchy of mankind over the animals.

It's time to set them free.

Veganism is the essence of compassion and peaceful living.

The animals are not ours to abuse or dominate. I abjure their use out of reverence

... I abjure their use out of reverence ...

I abjure their use out of reverence for all innocent life.

(from the album: "Destroy The Machines," 1995)

To Ashes

*Deterioration accelerates
My kin a prisoner
Now the reaper awaits
A demon encased
Inside of human skin
A profiteer that feeds
A plague of addiction
There's no option, There's no recourse
There's no other way
Every meth lab burned
To ashes
Every meth lab burned
Crimson flames
Against the darkened sky
The ultimate act of intervention
No other option left but to retaliate
Drawn to attack the source
The origin eradicated
Confronted with reptilian coldness
If not from me
Then someone else will sell this
Never accept that this
Is just an act of fate
The angers boiling down
Into absolute hate
Crimson flames
Against the darkened sky
The ultimate act of intervention*

*No other option left but to retaliate
Drawn to attack the source
The origin eradicated
Doused and set ablaze
Scales of justice raised
Every meth lab burned
Crimson flames
Against the darkened sky
The ultimate act of intervention
No other option left but to retaliate
Drawn to attack the source
The origin eradicated*

(from the album: "To The Death," 2009)

So Others Live

*Demented technology
Devised for the slaughter
Sentient beings' blood
Spills in frigid water
Harpoons pierce flesh and bone
Explosives detonate
Senseless killings continue
A sickening fate*

*Trivial excuses can't justify
The sane filled with rage
No reasons for these creatures to die*

*Waning numbers fade in seas
clouded with pollution
Pursued to the earth's end
To near extinction
Wailing fleet confronted
In harm's way at risk
The daring intervene
Courage passes its test*

*Trivial excuses can't justify
The sane filled with rage
No reasons for these creatures to die*

*The last line of defense to save a species
Shepherd's safety forfeit
So others live*

Now the carnage is challenged

*Demented technology
Devised for the slaughter
Sentient beings' blood
Spills in frigid water
Harpoons pierce flesh and bone
Explosives detonate
Senseless killings continue
A sickening fate*

(from the album: "To The Death," 2009)

Security Threat #1

*The weapons and drugs of dealers
Kill more in months and weeks
Than all of Al-Qaeda's victims
For the cartel's greed
Their number's equivalent
To an invading force
Violent drug gangs are terrorists
Track the chaos to its source
Terror tactics bribery
Torture and murder
Forced into a fearful silence
In a one-sided war*

*Security Threat number one
Security Threat number one*

*Collaborators betray
Till the system fails
Tally up the death toll
On a global scale
The body count rises
Overdoses and accidents
Bullets kill both innocents
And law enforcement*

*Security Threat number one
Security Threat number one*

*Don't tell me it's just a choice
Don't tell me it expands minds
Don't tell me it doesn't harm*

Don't tell me anyone else
(from the album: "To The Death," 2009)

Total War

Disrupt, destroy.

*Fuses burn 'til pipe bombs detonate
From the blasts concussion shattered walls quake
Rain falls through the pools of light
Beneath the street lamps as we run
Striking back against those who afflict and infect victims with the plague
Left strung out condemned to die, suffering in horrific pain.*

*Reason and warnings
All went ignored.
Amnesty's over.
Now total war.*

*The soldiers of the peoples revolt retaliate
With force against force determining their fate.*

*Districts in the Emerald Isle sink into a venomous flood
Their hands are forced driven to quell to draw out the guilty's blood.*

*Reason and warnings
All went ignored.
Amnesty's over.
Now total war.*

*The soldiers of the peoples revolt retaliate
With force against force determining their fate*

*Ravaging every class
All against, balance offset
Disrupt, destroy
The antidote to the sickness, the only way*

*Restabilize
Regain control
Restabilize
Regain control*

*Reason and warnings
All went ignored.
Amnesty's over.
Now total war.*

*The soldiers of the peoples revolt retaliate
With force against force determining their fate.*

(from the album: "Neutralize The Threat," 2011)

The Morbid Glare

*Practitioners of sadism
Their monstrous countenance
Evident in the morbid glare
Of perverse science
Beware the disease research
Pharmaceutical complex
Distorting propaganda
Leaves the public vex
Drugs and devices hyped as salvation
Hold back cures to prolong the treatment's extinction
The atrociousness of the intentional
Inducement of injury
Animal research persists a fraudulent practice
an unrealistic representation of humans
Wasting time costing lives
Misleading conclusions
Drugs and devices hyped as salvation
Hold back cures to prolong the treatment's extinction
Confinement... deprivation
Trauma... devastation
Differences in metabolism
Blood pressure and anatomy
Erroneous data is
All that there is to see
Practitioners of sadism
Their monstrous countenance
Evident in the morbid glare
Of perverse science.*

(from the album: "Salvation of Innocents," 2014)

All lyrics from selection posted online at: <http://www.darklyrics.com/e/earthcrisis.html>

19 December 2022¹³¹

by Collier Colfire

It felt like a fair December treatment.
Neither rain nor wind.
Temperatures only around the point of freezing.
Still.
I hate biking.
In the cold.
The cold hurts.
The body tenses.
Fingers go stinging numb inside the gloves.
I see a street light.
But no bugs around it.
It feels alone.
Not a pleasure.
Subsequently, I don't see any of the sports bikers who dominate the streets in the summer.
But they wouldn't bike this route anyway.
Too many cars.
Breathing in too much pollution.
Too risky with no proper bike lanes, too much broken glass, and too many intersections.
As a matter of principle I don't have lights on this bike.
I've always assumed that if a car could see me, they'd try to run me over.
I see them. And I keep distance.
Mom never liked that.
Because she cared.
She seemed to think others did or would.
But people can't really care in this system in that way under current living conditions.
In this sprawling open air prison complex.
So if they could see me, if their vehicle could just as easily kill me as not.

¹³¹ The day I wrote this, a friend of mine's daughter accidentally drove over and killed a squirrel on the way to the store to pick up a pack of cigarettes and alcohol for a friend.

Why not?

Not that I think anyone cares about specifically me in such a way.

Only that psychopathy permeates the mechanical matrix with callousness.

Randomness.

Like the streets I ride through.

Trash everywhere.

Worse in the winter.

People throw trash out their car window.

It sits next to trees.

In the brush.

On the slopes of each overpass.

Smatters on the sidewalk sparkling with threatening spikes ready to pierce a tire.

Next to the water drains.

Waiting to enter the waterways.

And choke with plastic whatever wild life comes their way.

Also, like me, no one wants to stop in the cold to pick something up and put it in a bin.

(A crappy “best alternative” in this scenario).

So we keep riding.

I stopped only once to pick up an empty plastic chips bag on the sidewalk.

Not out of the goodness of my heart.

But out of anger.

And spite.

I don't direct that anger at the kid who left it there though.

That kid probably got thrown away too.

Abandoned to a school.

Abandoned to a screen.

Which schools them.

Into isolation, alienation, and mechanical apathy.

I don't blame that kid's parents either.

They got abandoned too.

Thrown into various obligations and bondage such as rent.

Food (that no one can grow locally).

Bills (that seem to breed in the dark abscesses of bureaucracy).

Debt (that everyone has chronically).

Tax (that no one escapes to fund the military and police).
Petty fines (for petty shit).
Extortion (otherwise known as “insurance”).
And various other types of burdens and threats that stress people beyond their limits.
When they mostly want to find connection to each other.
To find enough silence to hear their own feelings.
To find time to create.
But instead, feel chased by digital hounds, cameras, and messages.
And so those parents get sucked into settling for entertainment.
“Indulging” in killing brain cells.
And “living it up” by “liberating” themselves with some substance that a chain of armed
drones calculates a profit.
They too fall into swirling maelstroms of addiction.
Because corporate industry constructed the maelstrom.
And the structure of society leads each person to walk the plank.
The insanity of perpetual tension and frustration?
Or satiating desire through relief in a plastic container?
That now lays on the side of the road.
Not that each of us can’t find space to do more.
We most often can.
But, systemically speaking, we live in a prison.
Yes, we pick up trash.
And industry produces far more the next day.
In the same locations.
Industry, in order to expand, must produce more and more needs.
More addictions.
More problems.
More “solutions”.
That, in turn, create new problems.
So industry makes new “solutions”.
All for more and more profit.
And so the structure of society with the maelstrom of addictions seems as complex as a
network of economic and psychic black holes interwoven with a web of fences.
Guards.
Missiles.

Schools.
Prison cubicles.
Mineral mines.
Factories.
Sports arenas.
Animal flesh...
in plastic.
On a shelf...
in a mall...
like a giant polystyrene onion that consists of layers and layers of advertisements.
Commercials and “news” that attract and distract the millions of minions...
ants with apps...
individualist armies of consumers directed by desire...
instigated by insecurities...
pressured toward the plank.
As complex as that entire “matrix” and beyond...
And as simple as the screen in front of you.
As simple as the road I ride down....
...a road designed to structure the journeys of vehicles (with or without a driver inside).
I don’t blame the CEOs for those industries.
They didn’t invent the systemic logic of terror and madness that underwrites all major
forms of production and exchange.
But I do feel anger.
I don’t curse the cold.
And I do abhor the smog and smoke.
But I do believe in fire.

8 Conclusion: Toward a Theory of War, Race, Addiction, Colonialism, and Ecology (WRACE)

Throughout this anthology, we have seen examples of racial divides locally, nationally, and globally. These divides relate to the violent construction of modern society in its entirety, from the domination and exploitation of animals to the domination and exploitation of people; from the replacement of nature-compatible societies with societies that ravage nature at ever-increasing rates to the wholesale plunder of cultures and habitats for the sake of feeding a wide variety of addictions.

A huge problem in research and societal approaches to addiction consists in individualizing phenomena. For example, if a student develops an Internet addiction or a worker develops an alcohol addiction, we don't tend to question the structural factors that contribute to such developments such as the fact that many schools and much work can feel like a waste of time at best or prison at worst for many students and workers. Of course, different people can respond differently to differently situations. But that fact has no relevance on the violence of the structure. If you place super-hot spice in one person's food every time they eat, they may love it but for another person, it could feel like torture. The very fact that society's structural parameters do not make concessions for variation of circumstance, or genetic, experiential, or biological constraints leads to bullshit jobs, unemployment, evictions, homelessness, desperation, stress, and, quite naturally, various coping mechanisms such as addiction. We cannot effectively or comprehensively address addiction without systemic change, dismantling racism, and, essentially, eradicating the class system, property, and wage enslavement.

Race permeates modern society. Although a social construction (no meaningful biological differences exist between people of different ethnicities or skin color), the idea, institution, and practices of race serve as powerful social barriers to maintain social inequalities consciously and meticulously created and maintained by colonizers through years of institutionalized racism. Subsequently, racial lines in, for example, the United States, still separate Black or Native working classes from their "perceived as white" European American counterparts. People of color live through higher risks. Disparities in punishment in the U.S. "primarily affect black Americans" (Tonry 2012: 54). While even prior to entering the court system, "between 2010 and 2012, young Black male civilians were 21 times more likely to be killed by police than young White male civilians" (Hall, Hall, and Perry 2016: 4). Subtle factors interplay with these risks such as the tendency to perceive Blacks as older than their actual age. In one well-known case, we can recall "Tamir Rice, a 12-year-old Black boy initially estimated to be around 20-years-old by the police officer who killed him" as he stood near a playground with a toy gun (Ibid: 5). These disparities can compound over a lifetime: "as many as 80 percent of young African American men now have criminal records and are thus subject to legalized discrimination for the rest of their lives" (Alexander 2011: 7). This relates closely to similar dynamics regarding addiction. Even though Blacks use drugs at approximately the same rates as "whites" in the U.S., they get punished for it far more:

1. In every year from 1980 to 2007, blacks were arrested nationwide on drug charges at rates relative to population that were 2.8 to 5.5 times higher than white arrest rates.
2. State-by-state data from 2006 show that blacks were arrested for drug offenses at rates in individual states that were 2 to 11.3 times greater than the rate for whites.
3. In every year between 1980 and 2007, arrests for drug possession have constituted 64 percent or more of all drug arrests. From 1999 through 2007, 80 percent or more of all drug arrests were for possession.

The higher rates of black drug arrests do not reflect higher rates of black drug offending. Indeed, as detailed in our May 2008 report, *Targeting Blacks: Drug Law Enforcement and Race in the United States*, blacks and whites engage in drug offenses—possession and sales—at roughly comparable rates. But because black drug offenders are the principal targets in the “war on drugs,” the burden of drug arrests and incarceration falls disproportionately on black men and women, their families and neighborhoods. The human as well as social, economic and political toll is as incalculable as it is unjust (HRW 2009: 1).

Consequently, the “War on Drugs,” a demonization of addiction, in effect, results in a demonization of people of color. Michelle Alexander has appeared as one of many scholars to explain how new forms of racial segregation and domination repeat the patterns of the old forms but under new names and with stylistic distinctions.

Imagine you are Emma Faye Stewart, a thirty-year-old, single African-American mother of two who was arrested as part of a drug sweep in Hearne, Texas. All but one of those people arrested were African-American. You are innocent. After a week in jail, you have no one to care for your two small children and are eager to get home. Your court-appointed attorney urges you to plead guilty to a drug distribution charge, saying the prosecutor has offered probation. You refuse, steadfastly proclaiming your innocence. Finally, after almost a month in jail, you decide to plead guilty so you can return home to your children. Unwilling to risk a trial and years of imprisonment, you are sentenced to ten years probation and ordered to pay \$1,000 in fines, as well as court and probation costs. You are also now branded a drug felon. You are no longer eligible for food stamps; you may be discriminated against in employment; you cannot vote for at least twelve years; and you are about to be evicted from public housing. Once homeless, your children will be taken away from you and put in foster care. A judge eventually dismisses all cases against the defendants who did not plead guilty. At trial, the judge finds that the entire sweep was based on the testimony of a single informant who lied to the prosecution. You, however, are still a drug felon, homeless, and desperate to regain custody of your children. Now place yourself in the shoes of Clifford Runoalds, another African-American victim of the Hearne drug bust. You returned home to Bryan, Texas, to attend the funeral of your eighteen-month-old daughter. Before the funeral services begin, the police show up and handcuff you. You beg the officers to let you take one last look at your daughter before she is buried. The police refuse. You are told by prosecutors that you are needed to testify against one of the defendants in a recent drug bust. You deny witnessing any drug transaction; you don't know what they are talking about. Because of your refusal to cooperate, you are indicted on felony charges. After a month of being held in jail, the

charges against you are dropped. You are technically free, but as a result of your arrest and period of incarceration, you lose your job, your apartment, your furniture, and your car. Not to mention the chance to say good-bye to your baby girl. This is the War on Drugs (Alexander 2011a: 97-98).

In 1972, fewer than 350,000 people were being held in prisons and jails nationwide, compared with more than 2 million people today (Alexander 2011a: 8).

No other country in the world imprisons so many of its racial or ethnic minorities. The United States imprisons a larger percentage of its black population than South Africa did at the height of apartheid (Alexander 2011a: 6).

What has changed since the collapse of Jim Crow [U.S. system of racial segregation] has less to do with the basic structure of our society than the language we use to justify it. In the era of colorblindness, it is no longer socially permissible to use race, explicitly, as a justification for discrimination, exclusion, and social contempt. So we don't. Rather than rely on race, we use our criminal justice system to label people of color "criminals" and then engage in all the practices we supposedly left behind. Today it is perfectly legal to discriminate against criminals in nearly all the ways it was once legal to discriminate against African Americans. Once you're labeled a felon, the old forms of discrimination—employment discrimination, housing discrimination, denial of the right to vote, and exclusion from jury service—are suddenly legal. As a criminal, you have scarcely more rights, and arguably less respect, than a black man living in Alabama at the height of Jim Crow. We have not ended racial caste in America; we have merely redesigned it (Alexander 2011a and 2011b: 8).

- More African American adults are under correctional control today—in prison or jail, on probation or parole—than were enslaved in 1850, a decade before the Civil War began.
- In 2007 more black men were disenfranchised than in 1870, the year the Fifteenth Amendment was ratified prohibiting laws that explicitly deny the right to vote on the basis of race. During the Jim Crow era, African Americans continued to be denied access to the ballot through poll taxes and literacy tests. Those laws have been struck down, but today felon disenfranchisement laws accomplish what poll taxes and literacy tests ultimately could not.
- In many large urban areas in the United States, the majority of working-age African American men have criminal records. In fact, it was reported in 2002 that, in the Chicago area, if you take into account prisoners, the figure is nearly 80 (Alexander, 2011b: 9).

I find that when I tell people that mass incarceration amounts to a New Jim Crow, I am frequently met with shocked disbelief. The standard reply is: "How can you say that a racial caste system exists? Just look at Barack Obama! Just look at Oprah Winfrey! Just look at the black middle class!" The reaction is understandable. But we ought to question our emotional reflexes. The mere fact that some African Americans have experienced great success in recent years does not mean that something akin to a caste system no longer

exists. No caste system in the United States has ever governed all black people. There have always been “free blacks” and black success stories, even during slavery and Jim Crow. During slavery, there were some black slave owners—not many, but some. And during Jim Crow, there were some black lawyers and doctors—not many, but some. The unprecedented nature of black achievement in formerly white domains today certainly suggests that the old Jim Crow is dead, but it does not necessarily mean the end of racial caste. If history is any guide, it may have simply taken a different form. Any honest observer of American racial history must acknowledge that racism is highly adaptable (Alexander, 2011b: 10).

The toxic illusion of “whiteness” has not, however, only demonized Blacks but essentially anyone not deemed “white.” Previously, in regard to addiction, Asians got demonized in the U.S.:

By the turn of the twentieth century, the association of Chinese immigrants with opium smoking was old news. Reports of the British Opium Wars of the 1840s and a steady stream of sensationalized, journalistic descriptions of American and Chinese “opium dens” had long confirmed the relationship of the Chinese with opium use for many Americans. What was different at the end of the century, however, was the slow proliferation of more properly “scientific” theories that sought to explain the growing phenomena of habitual drug use among all races of Americans. Chief among these was the “addiction” concept, a term that physicians began using sometime around 1900. Most of the new “addicts,” who had become steadily more visible after 1870, weren’t Chinese, nor were they opium smokers. They were instead morphine, cocaine, or heroin users and many of them had become “addicted” through the care of physicians who sought to allay any number of maladies by the hypodermic injection of narcotic drugs. But despite the presence of new drugs and new users, the association of Asian otherness with drug use and its effects persisted in the turn-of-the-century debate surrounding narcotic addiction. Scholars of the American drug problem have often noted that *fin de siècle* narcotic experts linked addiction with race. For instance, medical historian David F. Musto notes that “the southerner’s fear of the Negro and the Westerner’s fear of the Chinese” shaped American responses to a growing “drug problem.” In a similar vein, David T. Courtwright argues that changes in the demographics of the addict population, including race, led to the 1914 passage of the Harrison Anti-Narcotic Act, the nation’s first federal anti-narcotic legislation.

[...] I hope to begin a reexamination of the interplay between drugs and race in American culture by exploring several examples of turn-of-the-century, anti-Asian racism as it was embedded in the medical literature of narcotic addiction. The explanations of narcotic addiction disseminated in these texts did more than simply state that Chinese people used opium. Their writers continued these older associations but also surpassed them by suggesting that the threat held by the use of opium and its derivatives was *addiction*, an affliction that menaced white drug users with a reduction to the “condition” of the Chinese. This condition was comprised of many elements but its mobilization as a description of the predicament of being “addicted” had the effect of converting the practice of narcotic use into the manifestation of an inner state—into the expression of a hidden truth about the user. The use of race as a metaphor for addiction helped to shift the discourse of addiction away from the description of practices and moved it instead toward the investigation of essences.

[...] The insistence upon Oriental otherness opened a path through the confusing tangle of ideas that problematized the explanation of narcotic addiction to the lay public. It provided a means for these writers to explain the otherwise nebulous threat of addiction that they found hanging over the heads of their white, bourgeois readership. This operation also served, however, to describe people other than narcotic addicts. This essay, therefore, confronts a logic whose easy circularity was perhaps its most vicious feature. Narcotic addiction experts, who often argued that to be an addict was to be *like* the Chinese, further implied that to be Chinese was to be *like* an addict (Hickman 2000: 71).

Such racist practices have not, of course, hindered alcohol and drug companies from exploiting experiences of racism to use for their own targeted marketing:

Corporations target ethnic communities as consumers for liquor, beer, and cigarettes. The alcohol industry has become expert in using ethnic heroes, holidays, and cultural and historical artifacts to appeal to disenfranchised populations. The industry creates campaigns that focus on ethnic pride and nationalism. Common beer advertisement themes include the Mexican flag, successful African American entertainers, and Native American chiefs and warriors. The advertising is especially effective since ethnic minorities, kept out of the legitimate spotlight of national attention, seldom see their culture represented in other arenas. For many ethnic minorities who may feel excluded from the American milieu, the message seems clear; the alcohol industry recognizes and welcomes those cultures that were, heretofore, rendered invisible in most other sectors of society.

Moreover, for marginalized segments of our population, it is difficult not to see these alcohol media entreaties as an invitation to participate in the “good life” of the greater society. Admission seems to be available for the purchase price of the product. The implication is that the products will assist almost anyone in making that critical transformation into a more beautiful, more socially desirable, and successful person—such as those shown in the advertisements (Alaniz and Wilkes 1998: 447).

Furthermore, people of color, including Latinas, Blacks, and Native Americans, run higher risks of exposure to toxic waste dumps, more crowded and dilapidated housing, lead poisoning, and other environmental hazards (Brook 1998; Bullard 2021). Regarding Natives, for example, “rates of diabetes among indigenous populations in Canada are 3-5 times higher than the general population. In addition, American Indians and Alaska Natives have the lowest cancer survival rates among any racial group in the United States” (2012: 1645). And, “In Aamjiwnaang there was the noticeable decrease in male birth ratio, which residents attribute to their proximity to petrochemical plants. [...] Studies found that Mohawk women who ate local fish had higher levels of contaminants in their breast milk than a control group” (Ibid: 1647). Despite instances of affirmative action and preferential treatment in some cases, people of color, by and large, get lower access to quality education and quality health care, experiencing worse health while living and dying younger than their “white” counterparts (Barr 2008; Davis and Welcher 2013; Institute of Medicine 2011; Troyna 2012). For example, when Chicago shut down a large number of public schools in 2013: “Of the students who would be affected by the closures, 88 percent were black: 90 percent of the schools were majority black, and 71 percent had mostly black teachers—a big deal in a country where 84 percent of public

school teachers are white” (Ewing 2018: 5). And “Black and brown patients consistently receive inferior medical treatment—fewer angiographies, bypass surgeries, organ transplants, cancer tests and resections, less access to pain treatment, rehabilitative services, asthma remedies, and nearly every other form of medical care—than their white counterparts” (Matthew 2018: 1). Whereas “white” people could hand down wealth through generations, African Americans mostly had far less opportunities to do so as they had less to pass down. Subsequently, even while racial gaps in income have diminished, gaps in wealth have not: “in 2005, the median net worth of black households in dollars was \$12,124 compared to \$134, 992 for white households. In 2009, the median net worth for black households in dollars was \$5,677 compared to \$113, 149 for white households” (Warde 2014: 252). Finally, in regard to risks to ecological crises: “Climate change is anticipated to displace between 25 million and one billion people by 2050 [and] those most susceptible to climate-related disasters and slow-onset events are overwhelmingly persons classified as non-white” (Gonzalez 2020: 109, 117).

Wealthy countries and classes produce most of the emissions and pollution but working people of color pay the highest price. One needs to overlook these facts in order to blame eco-crises on things (such as “population growth”) that inordinately target the most exploited, least wealthy, and least-polluting communities (for the racist discourse and practices that underwrites “zero-population growth” policies, see Smith 1996).

Finally, when we think about addiction and the ways that it helps perpetrate ecological imbalance, we cannot forget the incredible impact of the Internet and the digitalization of society that seems to put all other addictions on steroids, exacerbating an already warped and destructive scenario. Take one small aspect of digitization, crypto-currency and take one of those currencies among many: Bitcoin alone uses more electricity than Denmark, Chile, and other countries: “The process of creating Bitcoin to spend or trade consumes around 91 terawatt-hours of electricity annually, more than is used by Finland, a nation of about 5.5 million” (Huang *et al.* 2021). The computer networks used to create digital “coins” clearly soak up insane amounts of electricity but to what end? Ostensibly to facilitate trade (something most societies throughout human history did without *any* electricity). And, in many cases, people use crypto-currencies to fuel the addiction of many people to make money off of simply *having money*. In other words, people invest in it, hype, and hope its value will surge so that that can “earn” money by having had money. Whether that aim succeeds or not, it amounts to a racket, a form of gambling, and we—and our environment—pay the costs for it. From cell phones to digital porn, from “surveillance capitalism” to online gaming, the prerequisites for participation in the global economy keep shifting as the terms of colonialism’s racist addiction keep shifting:

Colonialism, as conceptualised, has migrated from acquiring physical space to acquiring the human mind through the media. It has become a kind of psychological imprisonment through repetitive mass media and meddlesome digital manipulative messages that are channelled towards the entrapment of the eyeballs, ears, soul, attitude and disposition of the public. It does not require any coercive physical action or the conquering of any territory by the army of fortune claiming to be on a civilising mission but works its way through subtle persuasive packaging to enslave large audiences and nations. The internet’s extraordinary nature is coupled with that of the imperialist period. In the past, colonial land ownership was a matter of capital accrual, but now stakeholders are digital topographers, generating cybernetic space to discover new commercial territories. They are creating new

territory and workforce through technological firms, a variety of digital colonial hierarchy (Oji and Nzeaka 2019: 35).

With the development of “Artificial Intelligence” (AI), the prejudices, blind spots, and hyper-consumption of colonialist regimes transpose onto digital tools as they “autonomously” serve the same functions as any material technology that has simultaneously extracted resources, fed into power systems, and perpetuated inequality.

Colonialism as Racist Addiction

None of the above presents any new information. Yet, put the pieces to the puzzle together and one sees a more complex ecology of destruction. The key point here: national and racial disparities did not happen by chance but by design and “white” addiction to those power disparities contribute to their perpetuation. In other words, colonialism functioned—and still functions—as a class-operative, racist addiction.

If we begin with the principle of *addiction-profit-harm entanglement* described earlier, then the addition of race and colonialism gives a fuller picture of the social dynamics at hand. In this sense, we can even see a giant racist snowball effect: (1) the most vulnerable to climate change and eco-crises lose their homes and/or livelihoods as a consequence of (2) largely “white” addictions driven by industries which perpetuate destruction of habitats, extermination of biodiversity, exploitation of animals, and exacerbation of climate change. (3) This, in turn, disproportionately transforms Black and brown people into migrants who move to “whiter” places less likely to suffer ecological catastrophe and (4) the “whites” living there freak out and get even more xenophobic, paranoid, and nationalistic at the sight of a large influx of people of color. There seem few counter-dynamics in place to break this cycle.

Add in a few collaborators, people color speaking in the service of empire, and one gets neocolonialist system in which a few rule while the majority despair. Economic prosperity does not equate autonomy, does not equate physical health, does not equate ecological sustainability. The metrics of measurement themselves add up to a formula for systemic blindness to its own harms. We only know about the relatively few harms studied, not the many that may never receive any attention at all. Entire species die out without humans even knowing of their existence.

We essentially live in a color-coded open air prison in which all prisoner-citizens do not receive their fair share but get distinct and separate treatment according to a myriad of attributes such as inheritance (or lack thereof), where one grew up (and its economic and ecological parameters), where one attended compulsory “education” (and whatever PTSD might have resulted from that experience), whatever opportunities exist for self-sufficiency (meaningful jobs with a future? bullshit jobs with none? Land to grow food?), and how one gets treated by peers and bureaucracies along the way. The very practice of “property” through colonialism has racist origins (remember, John Locke, philosopher of “freedom” and investor in enslavement?).

Again, we don’t need much theory around this as we do action. But the fact remains that academics have slept on the job in regard to connecting the dots between addiction targeting → racist economic and legal system → prison/torture → perpetuated class disparity → social strife → ecological vulnerability = less power, money, and legal

avenues to affect the addiction targeting or the mass pollution or terrible living conditions. Therefore, we can lay out the reasoning behind the addiction-ecology connection as follows:

War

1. War, not an exception but the rule, serves as the basic mode of engagement between dominating classes and everyone else. (The governor of New York recently described a snowstorm as waging “war” against the people of New York. This magical mentality that attributes ill-intent to natural forces seems to stem from the impulse to frame the world in terms of war). War never actually ends in the colonialist mindset: conquer nature, conquer heathens, conquer rebellions, and so on. War (and the threat of war) remains the principle means by which otherwise unacceptable inequalities and unfair exchanges remain firmly in place.

Race

2. Race originally appeared in the form of “religion,” separating “heathens” from “believers,” separating Jews, Muslims, and Indigenous peoples from “Christians” (as if Jesus would have ever condoned such distinctions, much less the wholesale plunder and slaughter of people in his name). Racial categorization entails the superstitious creation of superior and inferior classes, backed not by science but by tradition, convention, fear, manipulation, and genuine—but distorted—quests for community, belonging, and order in a world rife with confusion, chaos, separation, alienation, and instability. The invention of the “white race” (which has no support from science) continues in society due to its usefulness in dividing people into dominant and dominated classes. Likewise, racism helps blind all levels of participants in this system to obvious solution. For example, Indigenous societies provide a bulwark against environmental destruction because they have demonstrated a superior capacity to protect and revive natural habitats. Yet, instead of supporting and protecting Indigenous peoples, colonialists’ wars and corporate obsession to exploit terrain threatens the very survival of many First Nations, Aboriginal, Indigenous, and Native peoples.

Addiction

3. Addiction perpetuates a system of dependency and denial which continually deflects responsibility and denies reality because the perpetrating parties feel unwilling and/or unable to face their own internal compulsions and the external consequences of their actions. Addiction, in the middle of the complex here, binds war and race with colonialism and ecology because each of them requires an element of addiction (including dependency and denial) to perpetuate an unequal and mutually destructive regime. Addiction permeates all of these confines as both a source and consequence of confinement and coercion. Addiction forms a *doubly* double-edged sword fabricated by colonial interests: (a) it both provides profit for the industries of domination as well as economic and psychic dependency of the class upon whom those industries prey; (b) it both destroys eco-systems through pollution and habitat destruction while destroying and polluting the minds of those whom the addictions dominate. Addiction permeates all social classes but the extended colonial system metes out more social stigma and legal punishment according to class as well as racial, geographic, gender, educational, and linguistic location. Addiction fuels the production and consumption of unnecessary and unhealthy products and services (or, at least, in unnecessary and unhealthy quantities) that stress, deplete, contaminate, and/or destroy animal lives, plants, fungi, and eco-systems. Addiction helps enable the perpetrators of violence, the recipients of violence, and the many mid-level actors (who

both receive and dole out violence) to drown their miseries, cloud their conscience, fabricate excuses, and escape their daily doldrums with a host of habits and substances. These habits and substances have the particular feature of inviting each actor in to complicity with the industries of enslavement and inequality, providing a sufficiently strong emotional attachment to products of enslavement as to require cognitive dissonance denial, and supply a steady stream of the very mechanisms of denial, forgetting, adaptation, and perpetual adjustment of each *human* person to an *inhuman(e)* system. Yet, make no mistake: *racist addiction harms everyone*. Elites can buy themselves time and hide behind their own drugged states of mind and self-deception behind fenced enclosures but the result of a destroyed planet ultimately benefits no one—not even the most powerful, racist billionaires alive.

Colonialism

4. Colonialism, not a descriptor of a bygone era but a contemporary system of ongoing plunder, exploitation, inequality, and destruction that uses somewhat different means of conquest and domination than those used 1 to 400 years ago. Back then, colonialists might have used disease, guns, technological advantage, newly developed forms of media, and economic institutions (such as the Dutch East India Company, Royal African Company, and the Virginia Company of London), to divide, conquer, and dominate a given population. Today, colonialists might use disease, guns, technological advantage, newly developed forms of media, and economic institutions (such as the WTO, World Bank, IMF, and a legion of multinational corporations) to divide, conquer, and dominate the entire planet. Colonialism fundamentally shaped and continues to shape global and local social confines. The practice of colonizing by various enslavers, mercenaries, and robber barons ultimately institutionalized a dependency upon living off of the luxuries of plunder. Wealth remains disproportionately in the hands of colonial powers (no disruption to colonial *de facto* domination has taken place within the last 400 years so no state of “post” colonialism exists).

Ecology

5. Ecology (coined by Ernst Haeckel whose theory of social Darwinism would later inspire the German Nazi party) functions in a conceptual sense as a primitive form of racism: it helps fabricate a mythical separation of “people” from “nature” as well as “humans” from “animals” when, in fact, the very material that constitutes our bodies and the very forces which help shape our minds come from “ecology” and “nature”. Economic theory, a psychic tool of colonialism, exemplifies this type of racism by demoting “ecology” to the realm of “externality” which means that one should not consider ecological values when making economic calculations. And then the same people who advocate such theories wonder how we ended up with ecological crises that threaten all human existence. Obviously, if one privileges profiteering and exploitation while diminishing and dismissing the very basis for life itself, one will, like any addict, hit the wall at some point. Yet denial comes into play: in order to function optimally within this system one must agree: *ecology* has less value than a *corporation*; *animals* have less value than *addictions*; *people of color’s need for food* has less value than *the right of “whites” to throw half of their food in the trash*. Failure to comply with the terms of this social contract can lead to a diminishing of one’s own rights within this system if one invests notable levels of commitment, solidarity, and sacrifice (beyond the obligatory lip service that politicians and corporations must perform in order to give the appearance of maintaining a reasonable ethical standard). Acknowledging the category of “ecology” as a racial classification helps expose the common war that colonialist addiction wages against people, animals, and environment.

The basic premise underlying the dynamics of domination here with each of these points entails *separating and diminishing life for the purposes of universally harmful exploitation*. In other words, colonialist exploitation harms the exploiters as well as the exploited. All parties suffer (albeit in different ways and degrees) by separating people from life, by perpetuating unequal treatment, by engendering exploitation, by submitting to racist addictions, by attempting to escape from awareness and accountability through intoxication culture. If *addiction-profit-harm entanglement* (APHE) describes a general mode addiction interwoven with economics, then the *war-race-addiction-colonialism-ecology* complex (WRACE) describes a specific historical system of domination tied to race that connects ecology (including animals) to racial domination. In other words, profit (*as an addiction*) drives other addictions in the form of a “legal” war of terror along the familiar battle lines of colonialism: first against terrain in which plants and habitats have the least value, then against animals (whether wild or captured and “farmed”), and finally against people divided along class and race lines in which sub-Saharan Africans and other people of color (who earn the least money for equal labor while the principles of wage-enslavement dole out increasingly higher salaries and social respect as the racial designation and class standing increasingly “whitens” and/or collaborates with the existing status quo¹³²). Subsequently, the consequences of ravaging ecologies for the sake of profit and harmful addictions come in the form of burdens shouldered disproportionately by working classes in general and working class people of color in particular.

Material technological development tends to disguise fundamental commonalities and techniques of domination. We also tend to miss the obvious because we get so used to it. Therefore, even if we could recognize the racist and exploitative dynamics of the coffee industry in its origins, we may not want to believe that workers on coffee plantations get exploited today. We may consume something as seemingly innocent as a banana without thinking of—or even knowing about—the chemicals used by huge banana companies that devastate both the environment and the workers who grow them, leading to infertility, cancer, and death (see Gertten 2009). But even when we somehow see that one certain product or one certain history derived from racism, war, terror, and ecological destruction, we still have difficulties in imagining that this still holds true with regard to the material technologies that compose our daily life. We do not tend to think of the Internet itself as racist even though the material extractions and subpar wages used to create and maintain it employ racist logic as justification for such unequal treatment. We could focus on non-material or human technologies to resolve many of our issues but the term “technology” has itself come to signify things related to profit-driven and extraction-dependent industries rather than simply techniques and science which we employ simply by using language, communicating, meditating, listening, waiting, or re-evaluating. The following quote discusses material technology but it speaks to another aspect, not the material extraction or racist system that seeks to justify it, but the way in which material technology serves to both drug us and detach us from our original context: nature.

¹³² Whether in Singapore, Saudi Arabia, or China, government and business officials who cooperate with the rules of the extended colonial system’s shell game get rewarded according to (a) their usefulness (e.g., their domination over key resources or geopolitical service), and (b) their willingness to collaborate with international system of addiction and domination (WRACE).

Technology is as much a part of us as are our hands, legs, eyes, and ears; and minds and selves are not separate from bodies. To extend spiritual-body-selves humans have always used tools. Some other animals use them to some extent, but they play a massive and distinctive role in human life. [...] But technology is a threat because its ecstatic reach absolutizes itself, peripheralizing other ecstatic capacities. It cannot adequately substitute for them; it even tends to erode visceral and empathic bonding with many of the things in which it involves us. Either the brightness of new technology eclipses other ecstatic modes of being, or the stupefaction of routine technology dulls the self. Technology—new or routine—is an avalanche that buries the quiet and sustaining ecstasies of the sacramental life. These were the ancient ones in which humans delighted in simply being-with everything else. These were the ritualized ecstasies that bound people into the Whole and rendered their lives momentous and coherent. In the garb of marvels—limitless atomic power, spy satellites, e-mail and television—technology conceals sacramental openings on the world, and conceals the concealing.

[...] Modern industrial technology shows a radical shift away from the seasonal, from natural cycles of exertion, rest and repair, re-exertion. To maximize output in the production line, all tools are used all the time and workers are specialized, typically using only one tool all the time. Numbing repetition suggests a degenerated addiction in which even passing pleasures are missing (Wilshire 1999: 221-222; 226).

Technology, in this sense, helps engage us in its allure as well as provide the means and gravitational pull to transport us away from any given locality, detaching us from fundamental relationships to plants, animals, rivers, lakes, mountains, soil, bugs, birds, bacteria, fungi, valleys, forests, jungles, deserts, fields, and seasons in those localities. All Native peoples—even nomadic societies—had special relationships to location (nomadic communities typically had relationships to their *routes* and places and animals throughout and along those routes). In the words of Freeman House:

Salmon is the totem animal of the North Pacific Range. [...] Totemism, is a method of perceiving power, goodness, and mutuality in locale through the recognition of and respect for the vitality, spirit, and interdependence of their species. In the case of the North Pacific Rim, no other species informs us so well as the salmon whose migrations define the boundaries of the range which supports us all... It is the nature of industrial capital that it has no interest in preserving indigenous populations, since capital is mobile and can move on once a “resource” has been exhausted. Indigenous populations cannot flee this rapacity because of their biological marriage to habitat. What is not generally recognized is that the human species is also an indigenous population. We too are inextricably married to place. We can only be kept constantly informed of our situation as a species through regard and recognition of brethren species. The life of the wild salmon population is of the essence of the life of the human population (quoted in Wilshire 1999: 91-92).

Without this connection to locality, we seek relief, gratification, and intoxication.

...when we mentally reach beyond the local environment, we tend also to overlook our primal needs as organisms to deal with local place and its rigors: to explore in it, achieve rich sensorial contact, and enjoy kinship with its quietly arboreal and bustling animal life. If we lose this contact habitually, primal needs go unmet. We imagine immediate substitute gratifications—caffeine, cigarettes, cocaine, mere sex. We cannot wholeheartedly own up to these gratifications, for they are not needs that through evolution constitute our very being. They are counterfeits that lead to dependency and loss of self-respect. [...] This disorientation within body-self is a trance state in which addictions flourish (Wilshire 1999: 18).

Evidence suggests that a component of violence in many hardened criminals is physiological, a matter of diet. Consumption of junk food whenever hunger pangs occur leaves withdrawal symptoms so disturbing that only a violence-rush can allay them for a while. Normal hunger pangs degenerate into addictive cravings. And we can be addicted to the excitements of criminality. When offenders are put on a farm and raise and eat vegetables, relapse into crime is reduced (Wilshire 1999: 16).

As one First Nation person put it: “The new genocide is nutrition and health. Our people are dying off because of these diseases: alcoholism, diabetes, cancer, heart disease” (Myhra 2011:24). This has multiple implications: First, genocide, we should not need to say, seems worth resisting on its own merit; second, indigenous communities tied to Native traditions consume, and subsequently pollute, far less than average; third, studies have shown Native societies to provide better and more sustainable care for forests and jungles than non-Natives (Carrington 2021). We need not look far. Native peoples show the way toward more balanced lifestyles. But we must *face*—not necessarily *conquer*—all of our addictions to do that.

The Devil in the Details

As with a hologram, the microcosmic dynamics of WRACE mirror the macro. Although we also see exceptions to the rule, changes in form, and nuanced distinctions, we nonetheless need not look far to see examples of how war, race, addiction, colonialism, and ecology appear in daily life. For example, when someone drinks their daily coffee with sugar and milk, we don’t *think* we ingest the very fabric of a war against animals or the entrails of colonial racist history. We don’t think we do it. But we do. We don’t necessarily *see* war and racism as the pillars of our routines and homes but that doesn’t mean they don’t exist. The intersection of ecology and addiction in our daily lives stretches far back in time but greets us every day somewhere in some form.

The success of European sugar slavery would establish a working template and infrastructure for coffee slavery. Seeking to Europeanize coffee, sugar, tea, tobacco, and chocolate and control their own supplies, mercantile empires of the Old World exploited their New World colonies and African slaves to produce these commodities. [...] The demand for drugs moved history, moved black and brown bodies across the sea to satisfy white cravings (Knight 2013: 76-77).

Although many of us try to tell ourselves that today's substandard living wages has no resemblance to chattel enslavement, the experiences of confinement, hunger, fear, and anxiety amid many workers and unemployed, both "domestic" and "foreign" speak otherwise. We see through their historical trajectories in race and domination how, rather than distinct or separate, the saplings of domination grew into a forest of control.

Slavery in the Americas was designed to produce commodities for the consumption and pleasure of the Western world, and many of the habits conceived and nurtured by slavery survive, in modern form, down to the present day. Similarly, a number of major artifacts (some of them so commonplace that they are unexceptional—banal even) have their origins and dissemination in the world of slavery.

[...] As early as 1628 (only fifteen years after the first Virginia tobacco arrived), England imported 370,000 pounds. It has been calculated that, fifty years later, enough tobacco was shipped into England to allow a quarter of the population to have one pipe a day. [...] The 37 million plus pounds of tobacco exported to Britain in 1700 had increased to 100 million pounds in 1771" (Walvin 2017: 9-10, 58).

To produce maximum profits for this new addiction, Europeans kidnapped or purchased kidnapped Africans in huge numbers such that by 1776—the year of the so-called American Revolution in the name of "liberty"—120,000 Africans had landed in Chesapeake while enslavers chanting "freedom" and "independence" forced them into unpaid labor to produce often unnecessary and unhealthy products such as tobacco. In the 17th and 18th centuries (1600s and 1700s), tobacco transformed social life:

What had once been luxurious became commonplace. Even the poor were affected. Working households of the late 18th century tended to own more items than their counterparts a century before. [...] But the rise of tobacco consumption was altogether more spectacular. Tobacco very swiftly became a feature of life of the alehouse and tavern, and established itself as a focal point for male sociability and camaraderie. It also spawned a clay pipe industry and, by 1730, hundreds of millions of clay pipes had been manufactured. They were, in effect, the first disposable consumer item, and their fragmented remains are to be found in archeological sites in Europe, Africa, and the Americas. [...] By the end of the 1880s, a machine could produce as many cigarettes in a minute as a female worker could in an hour. [...] By 1920...Americans were smoking 350 billion cigarettes each year. [...] In 1990 the USA produced 695 billion cigarettes, Europe 631 billion, China 1,525 billion. Today, China has 300 million smokers: more than one half of all Chinese men are smokers, and seven out of ten of the world's top cigarette brands are Chinese. The total economic activity of the world's tobacco companies amounts to \$97.19 billion (Walvin 2017: 61-62; 75-76)

Note that tobacco rose in tandem with and tied to another addictive substance: alcohol. Taverns would even sell tobacco, a new drug that aided males in the act of (according to a commenter in 1614): "the forgetting of miseries and sorrows" (Walvin 2017: 63). Additionally, explosion in the printing industry and newspapers took place at the same

time as tobacco and, as with tobacco, the newspapers proliferated with the leisure time at alehouses, taverns, and coffee shops (Walvin 2017: 195).

Tobacco also rose in strength as a commodity produced through enslaved labor and yet, who reaped the profits? Even the banning of enslavement awarded the enslavers—not the enslaved. In 1833, Britain banned enslavement by purchasing (and “liberating”) the enslaved from the enslavers with taxpayers’ money (for £20 million, roughly £2 billion today) (Walvin 2017: 123-124). Imagine if that logic applied in general to criminal activity... the government wants someone to stop killing, kidnapping, or raping so they *pay* the culprit to stop.

The £20 million compensation that was paid for the slaves’ freedom was channeled into a host of British and imperial investments. Compensation allowed [wealthy and “white”] Britons to fund investments at home and abroad, from Scotland to Sydney. It invigorated and enhanced colleges, universities, museums, galleries, and private cultural collections. It found its way into bricks and mortar, as former slave owners used their compensation to buy, renovate, or extend estates and town houses, castles, churches and public buildings, or simply create monuments to themselves (Walvin 2017: 124).

This financial award for racist terror therefore helped entrench the history, values, and denialism deep into cultural norms and institutions. Yet, because enslavement no longer has public approval, its key role in forming the foundations of modern colonialist civilization gets typically underrated.

The Atlantic slave system was so massive, so pervasive, that it became part of the warp and the weft of Western life itself. Atlantic slavery was a vast economic enterprise which involved hundreds of thousands of sailors, tens of thousands of voyages, millions of Africans, centuries of economic activity, scores of commodities and goods, complex financial dealings—over a period spanning more than three centuries. How could so vast a structure, so pervasive a system, *not* intrude into the very fabric of Western life? And yet...

In the case of Europe, lying as it does geographically removed from the centers of slave activity, it was easy not to spot the slave connections. Moreover, many of the physical traces left by slavery seem detached, unconnected to slavery itself. How is one to make the link between the splendors of a British stately home and the slaves whose labor was integral to that property? Here lies one of the great paradoxes of slavery. The people who profited from slavery often distanced themselves from it. They often sought to confirm their rise to material and social eminence by surrounding themselves with the elaborate, physical trapping of wealth (Walvin 2017: 125).

Another area that tends to get overlooked in regard to addiction and racial domination: guns and metallurgy. The companies and cultures that specialized in making and selling guns and other weaponry also specialized in using them to dominate others.

The difficulty of restraining Africans was at its most acute, and most dangerous, on the slave ships. [...] Shipboard rebellions were frequent. Nine in ten voyages—perhaps even

more—experienced some form of slave resistance [...] without the brutal hardware of incarceration, most notably the chains and fetters, open rebellion would have been even more widespread and more successful. [...] chains were ubiquitous. From the loading of the slave ships at the European and American dockside, to the African coast, in mid-Atlantic, and finally on the plantations of the Americas, chains were inescapable in the world of the Atlantic slavery. Yard upon jangling yard of chains were unloaded onto every slave ship bound for the African coast, alongside a vicious array of other metal items; handcuffs, leg irons, speculums for forced feeding—right down to the simple, excruciating thumb-screws, used to force confession from potentially rebellious Africans.

[...] During its relatively brief history, the Royal African Company had enjoyed a flourishing trade in firearms (and gunpowder and knives) to the African coast. Between 1673 and 1704, the Company exported almost 60,000 firearms to West Africa. [...] By the second half of the 18th century, the English alone exported between 150,000 and 200,000 guns *annually* to West Africa as part of the slave trading system.

[...] Another major export of metal goods to Africa was in the form of iron bars. Initially trans-shipped from Sweden, but increasingly shipped direct from British iron industries, iron bars formed a regular trade in the barter and exchange for slaves in West Africa (Walvin 2017: 220-222, 229, 231).¹³³

The ravages of addiction throughout the colonized and colonizing world show the resilience of addictive institutions to entrench themselves in all contexts despite the obvious social and ecological costs.

Alcoholism is a social disease of epidemic proportions in South Africa that affects primarily the poor and working classes, which are hardest hit by both the causes and effects of alcohol and alcohol abuse.

In South Africa, the majority of violent crimes are alcohol related as, in the majority of those reported, either or both the assailant and/or the victim are under the influence of alcohol when the crime takes place. This, in a country where the biggest city, Johannesburg, has recently been recognised as the world's most violent city. And, contrary to what mainstream media might have us believe, the majority of victims of violent crime are poor and working class. Not only the victims, but also their assailants are victims,

¹³³ Although James Walvin provided interesting accounts in *Slavery in Small Things*, he curiously focused on the “small things” part of the study rather than the enslaved people implied by “Slavery”. Certainly, he did give some attention to the experiences of the enslaved in his section on narratives but in his discussion of tobacco, he focused on the product and its use as if the item had its own life whereas the hundreds of thousands of lives enslaved to its production received no story, no names of any of the enslaved, no detailed accounts of what life working on a tobacco plantation looked like. Walvin merely mentioned Africans “arriving” in a very passive sense, devoid of the obvious violence required to *make* them “arrive” even if later in the book, as cited above, he devoted some attention to the aspect of violence. Perhaps he struggled within himself to reconcile oppressive academia that consistently dehumanizes with an instinctive sense of empathy that attempts to *rehumanize*. Either way, the book focused more on a history of *artifacts* than *people*. It seems a striking example of how, centuries later, the eyes of “white” enslavers still direct the gaze of “white” academics. As partial correctives to this oversight, see, for example, Maria Franklin, “Enslaved household variability and plantation life and labor in colonial Virginia.” *International Journal of Historical Archaeology* 24, no. 1 (2020): 115-155 and Renee K. Harrison, *Enslaved Women and the Art of Resistance in Antebellum America* (New York: Palgrave Macmillan, 2009).

indirectly, of violent crime; as more and more people—particularly poor youth—are going to prison for crimes they have committed under the influence of alcohol. Crimes that are often not premeditated, but committed under the influence of alcohol—on a whim—and which, had the perpetrator been sober, they might not have committed.

[...] Another example of how alcohol was (and sometimes still is) used to keep workers down in South Africa was the “dop system”, whereby farm owners on the wine estates in the Cape, and probably elsewhere, paid their workers (or subsidise their wage) in alcohol. The devastating effects of this, on both the vineyard workers and their families are not hard to imagine.

[...] During the struggle days radical youth in South Africa frequently razed liquor taverns to the ground, because they resented the fact that not only were their fathers giving all their money to the enemy, while their families suffered, but they also recognised that alcohol was making them passive and unwilling to fight against apartheid (Jonathan 2008: 3, 5-6).

If we take another example of racism intersecting with a specific industry and specific ethnic group, we can see the effect of menthol cigarettes on African Americans:

As regulation of the tobacco industry has grown more and more extensive in recent decades, menthol cigarettes have been an exception. They account for more than one-third of cigarette sales in the United States and are especially dangerous because the menthol enhances nicotine’s already potent addictive effects.

Now the Food and Drug Administration is moving to ban these cigarettes, smoked by more than 18 million people ages 12 and over. Among Black smokers, 85 percent smoke menthol cigarettes, compared with 30 percent of white smokers. Banning them in the United States is a crucial step in the decades-long effort to reduce smoking, especially among young people. The toll is enormous: Nearly a half-million people die every year from smoking-related illnesses [in the U.S.].

From the start, the marketing of menthol cigarettes, targeted at Black people over the past half-century, was built on an underlying, deeply cynical deception: They were healthy and restorative.

First promoted in the 1920s and 1930s, menthol cigarettes were trumpeted by the tobacco industry with a false therapeutic promise that they would relieve what was called “smoker’s throat” (Wailoo 2022).

A similar dynamic has taken place in regard to “malt liquor,” a lower quality, high-alcohol version of beer (Chapman and Brunsma 2020; McKee *et al.* 2011).

In 2018, 26% of people reported having engaged in binge drinking, i.e. five or more drinks for men or four or more for women on the same occasion, and 6.6% reported heavy alcohol use, i.e. binge drinking for 5 or more days in the past month (NSDUH, 2018). High rates of alcohol consumption and risky drinking patterns are responsible for pathological consequences, such as alcohol-associated liver disease, and represent critical risk factors

for several cancers (WHO, 2014). Furthermore, risky drinking patterns are associated with functional disabilities, such as impaired mental health, social dysfunction and premature mortality (Harris *et al.* 2022: 330).

“Whites” overall drink more alcohol than Blacks yet Blacks still suffer worse health consequences due to inadequate treatment, diet, and less access to proper preventive care. As with tobacco:

Previous research consistently shows that smoking-related negative consequences are more prevalent among Black than White individuals. Although Black people typically have a later age of smoking initiation and smoke fewer cigarettes per day than White people, they experience higher incidence and mortality from smoking-related diseases, such as cardiovascular disease, cancer and chronic obstructive pulmonary disease. [...] minoritized background and lived experiences of racism are important factors to consider in the conceptualization of comorbid alcohol and nicotine use (Harris *et al.* 2022: 331, 337).

Although not obviously related to typical addictions, the practice of “redlining” shows an example of ecology and racism: “In the wake of the Great Depression, when the federal government graded neighborhoods in hundreds of cities for real estate investment, Black and immigrant areas were typically outlined in red on maps to denote risky places to lend. [...] differences in air pollution exposure between redlined and better-rated districts [are] even larger than the well-documented disparities in exposure between people of color and white Americans. [...] With less green space and more paved surfaces to absorb and radiate heat, historically redlined neighborhoods are 5 degrees hotter in summer, on average, than other areas. A 2019 study of eight California cities found that residents of redlined neighborhoods were twice as likely to visit emergency rooms for asthma” (Zhong and Popovich 2022).

Yet another example of racist addiction in action: the U.S. government stole land and deprived Native Americans of their sovereignty and then left many on reservations with little option for gainful and meaningful employment:

Native Americans living on reservations are among the poorest people in the United States, with median household incomes that are 60 percent lower and poverty rates that are five times higher than national averages. To spur economic development, a handful of tribes opened large-scale bingo halls and/or casinos with Las Vegas-style gambling in the late 1970s and early 1980s.

[...] Today, there are over 310 gaming operations run by more than 200 of the nations’ 556 federally-recognized tribes. Of these operations, about 220 are “Las Vegas” style casinos with slot machines and/or table games. By 1999, about half of tribal members in the lower 48 states are in tribes that run a casino-style gaming operation. By 2000, Indian-owned gaming operations generated about \$10 billion in revenues, about one-sixth of all revenues generated by legal gaming in this country.

[...] The *Boston Globe* reports, “While a few dozen tribes lucky enough to own reservation land near major population centers make headlines with gambling casinos

generating mind-boggling wealth, the vast majority of America's Indians remain mired in poverty, victimized by ill-conceived federal policies and a gathering backlash spurred by the myth that Native Americans everywhere are cashing in.

[...] Four years after tribes open casinos, employment increases by 26 percent, and tribal population increases by about 12 percent, resulting in an increase in employment to population ratios of five percentage points or about 12 percent. The fraction of adults who work but are poor declines by 14 percent. The increase in economic activity appears to have some health benefits in that four or more years after a casino opens, mortality has fallen by 22 per 100,000 in a county with a casino and an amount half that in counties near a casino. Casinos do, however, come at some cost. Four years after a casino opens, bankruptcy rates, violent crime, and auto thefts and larceny are up 10 percent in counties with a casino (Evans and Topoleski 2002: 1-2).

In other words, instead of recognizing Native Americans as proper custodians and guardians of natural eco-systems, the government coerces Natives into a system of unproductive addiction, tearing down habitats and channeling material resources and electricity for the sake of unproductive addictive behavior. I cannot help but think: "Addictive gambling, for example, is a repetition without orientation. [...] One is penned up in addictive repetitions—like a wolf or coyote relentlessly pacing its cage—with a wild hunger and no way to consummate the longing" (Wilshire 1999: 11).

Patriarchy: Racism Against Women

"And a piercing fate denies my life" -Articles Of Faith

They handed me a script when I was born
That told me how I should live as a womyn
They shoved it in my face and when I could no longer accept it they BRANDED me
So now I walk as an image rather than a humyn being
I am not an individual I am defined only as one of a race plagued with stereotypes
and submission
And they brand me when they tell their jokes
And they brand me when they tell their lies
And they rape me when I walk down the street
And they rape me with their dead eyes
-Alyssa Chunx¹³⁴

¹³⁴ Quoted in the Canadian zine *Seen Not Heard* #1, 1992: 3.

Of course, we think of prejudice or violence against women as “sexism” and, in some sense, this seems accurate because no one sees “women” literally as a separate “race.” But that belief seems to implicitly suggest that racism has something to do with scientific definitions of race—and it absolutely does not. Racism has to do with arbitrarily separating a class of people for substandard treatment and patriarchy does exactly that with those designated “women” (whether they received that designation at birth or not). Women get subjected to disproportionate degrees of violence in countless ways. Whether the exposure and vulnerability of women during forced climate migration from Central and South America to North America or the increase in inter-relational violence due to financial stress and social problems exacerbated by intoxicants, women do more work for less money and end up on the receiving end of the vast majority of domestic violence. “1 in 3 (30%) of women worldwide have been subjected to either physical and/or sexual intimate partner violence or non-partner sexual violence in their lifetime” (WHO 2021). “Yet another devastating effect of alcohol related violent crime is the spread of AIDS as a result of alcohol-related incidents of rape and, once again, the majority of rape victims are women from the working class” (Jonathan 2008: 3).

The females and children have been the victims of family violence in most societies and cultures. The use of tobacco, alcohol and narcotic drugs are responsible in aggravating the violence. Incidences of domestic violence is significantly higher in substance abusers than others. It is equally present in countries where the status of women is high. Education level and economic status does not affect the incidence of domestic violence. Therefore we must look at other factors which perpetuate domestic violence. It is time for governments, societies and thinking people to give serious thought on how to reduce domestic violence and bring sanity into the community. Tobacco, alcohol and narcotic drugs are well on their way to the “road of destruction” and fragmentation of social fabric. The conscience of the world needs to be roused to prevent the march of substance abuse (Bhatt 1998: S25).

South Africa has one of the highest alcohol consumption rates in the world. This high consumption rate is seen as a major contributing factor responsible for the high rate of domestic violence (Seedat *et al*, 2009). It has been estimated that the per capita consumption rate of alcohol in South Africa is between 10.3 and 12.4 litres, and consequently higher than the Southern Africa regional average (Peltzer & Ramlagan, 2009). The history of alcohol abuse in South Africa is inextricably linked to the history of race relations during the apartheid regime (1940s-1994) (Rataemane, 2006). It should be noted that segregation on the basis of race predates the official institutionalization of apartheid regime in the 20th Century. Hence, there were racial ideas that underlined social constructs of “alcoholism” in the 20th Century. These ideas, which were formed in the past centuries, were rooted in colonialism and race profiling. According to Mager (2004), the robust colonial liquor trade in the nineteenth century gave rise to two sets of belief: firstly, the belief that a strong liquor industry was good for the colonial economy, was necessary for the generation of taxes, profits and jobs. Secondly, African responses to the liquor trade generated a discourse of “the African character” underlined by the abuse of liquor (Mazibuko and Umejesi 2015: 720).

So we can see overlaps and intersections between racism, patriarchy, and colonialist domination. Stress due to racism, intergenerational trauma, and economic inequality can

also contribute to and exacerbate objectification of women and sexual addiction (Robinson 1999). The entire porn industry exemplifies a tremendous waste of energy, electricity, plastic, and paper resources toward the end of fueling unnecessary and unhealthy habits that, by and large, perpetuate at personal levels the very frameworks of objectification, separation, and diminishing of life that produced the system to begin with. Finally, patriarchy's racism against women manifests in the ways that racist assaults on livelihoods and local ecologies (as in all wars) hit women the hardest. Even when they have the "simple" goal of resource extraction or monopolizing a given market, corporations and governments exact a higher toll on women by their very assault and lack of consideration for its impacts.

"What befalls the earth, befalls the women of the earth. When the land and water are ravished and poisoned and destroyed, the women are deeply affected. As Indigenous women, the connection to our homeland is not only physical, it is biological and spiritual. We have always been on the frontline when our traditional territories are put at risk" (Alma Brooks, Maliseet grandmother, St. Mary's First Nation, New Brunswick).¹³⁵

Women in general and women of color in particular bear the lion's share of labor at home and in the market in part because much of what gets allocated for women to do (child-rearing, cleaning, cooking, etc.) does not even get recognized as work unless they receive payment for doing it. Women also get left picking up the pieces from messes that patriarchal industries dump on them. For example, "When toxic substances and pharmaceuticals are banned in the First [sic] World, they are often dumped in Third [sic] World countries" (Merchant 2005: 252). These types of racist maneuvers inadvertently impact women the most even when corporations do not explicitly target them. We can exemplify with the "drug war" in Colombia.

For instance, referencing aerial eradication in the context of unfair state policies applied to comunidades negras in the midst of the civil conflict, one gentleman publicly complained: "They came to dump all that glyphosate and we think to ourselves: It is a banned chemical but they have to exhaust it to satisfy the United States. The United States finances it, so they dump it on us in the Pacific Coast. They dump it on us blacks, on our houses. So we are punished two or three times, not just because of the war but also because of state policies." [...] A report on the effects of aerial eradication created by a women's rights organization in Cauca states:

"We reject every type of mono-crop that threatens the life and dignity of our communities. We are conscious of the fact that we live in a region with fragile ecosystems that cannot withstand those types of practices without endangering biodiversity, cultural identity and the region's economy. In that sense, we reject coca, oil palms and the practices employed

¹³⁵ Cited here: "Women of Courage: Gendered Impacts of Resource Extraction," <https://www.kairoscanada.org/what-we-do/gender-justice/gendered-impacts-of-resource-extraction-overview> ; See also: *Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls* (2019): https://www.mmiwg-ffada.ca/wp-content/uploads/2019/06/Final_Report_Vol_1a-1.pdf "Resource extraction projects can lead to increased violence against Indigenous women at the hands of non-Indigenous men, as well as increased violence within Indigenous communities" (2019: 584).

for their implementation in Afro-Colombian territories.” [...] In terms of coca cultivation and aerial eradication, it is important to remember that these activities not only contributed to the physical displacement of individuals, families, and communities, but also to the disruption of the spaces where people interact with each other.

For example, Yolanda also reasoned that women were the most impacted by aerial eradication because they perform many daily activities uniquely connected to water:

“Nowadays in our communities we do not have aqueducts as they do in other places. So we do everything at the river: fill up containers for water to make food, wash clothes, bathe...everything. And us women of the Pacific have that daily connection with the river. So they fumigate the river and logically, we are the ones most affected.”

[...] Thus, aerial eradication both made the river unsafe and disrupted an important space where “informal networks of neighbors and kin gather”. The collective action suit report for the communities of Timbiquí and Guapi describes how many people reacted the first time they saw aerial eradication:

“Many people, mostly women and children, not knowing the seriousness and toxicity of the substance falling on them, happily went outside to observe, for the first time, the novelty of the airplanes flying close by their homes and crops, discharging what they called ‘white rain’ and this toxic mixture landed directly on a lot of these people” (Huezo 2019: 314-317).

These types of racist and colonialist violence do not leave women outside of the cycle of addiction. To “treat” their own trauma and suffering, women too fall into cycles of dependency without getting equal attention or treatment as those perceived as “men”. This dynamic can manifest proportionally: more violence, leading to more “self-medication.” Women subjected to more severe domestic violence subsequently tend to use alcohol more intensely in response (Kaysen *et al.* 2007).

In Conclusion...

The significance of race and racism does not, however, by any means, imply that working and disenfranchised people designated as “white” do not also get exploited, mistreated, abused, and alienated by the colonialist racist system of profiteering and addiction.

Certainly, Indian people in the U.S. and Canada are not the only cases of social and cultural dislocation that can be found in history. E. P. Thompson’s (1966) classic work on the transformation of the working class in England tells the story of dislocation experienced by the working class that, as German social historian Wolfgang Schivelbusch (1993) points out had a dramatic impact on the drinking practices of the new industrial proletariat. Alexander (2000) makes a similar point when he suggests that the dominant occupations in the Vancouver area—logging, fishing, and mining—separated working class men from their families for months, a fact that contributed to greater cultural dislocation (Granfield 2004: 30).

We might more usefully see the Great Dislocation from nature as a form of incarceration through dependency upon wage labor. When people get conditioned that they “must” pay their bills because living self-sufficiently off the land no longer remains an option, cities essentially function as giant prisons. For “civilization” to sustain this type of total incarceration, or human zoo, people’s minds, which function as a primary door to alternatives must remain locked. Each person on this planet descends from indigenous people robbed at some point of the capacity and opportunity to live collectively, harmoniously, and sustainably within their local eco-systems. Yet we must believe that some people qualify as “white” while others get racialized. In order to fully accept our universal imprisonment, we must believe that only some “bad” people get incarcerated while “ordinary” people live in “freedom” even while this system of addiction and abuse imprisons everyone: we simply live in different cages, in different conditions, with varying levels of comfort, stress, luxury, risk, or hardship. And this, in turn, affects the degree and type of our susceptibility to self-harming addiction. Consider for a moment that in the US in 2007-2009, “an estimated 58% of state prisoners and 63% of sentenced jail inmates met the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for drug dependence or abuse,” “4 in 10 prisoners and jail inmates used drugs at the time of the offense for which they were currently incarcerated,” and approximately “21% each of state prisoners and sentenced jail inmates said their most serious current offense was committed to get money for drugs or to obtain drugs” (US DOJ 2017: 1, 6). These people have all gotten triply punished: subjected to dislocation, immersed in addiction, and finally locked behind bars. Those calling themselves “free” live similar lives (dislocated, immersed in addiction) except that they walk *into* bars rather than live behind them. Prison abolition means addressing addiction.

Racist addiction harms and constrains us all—even as nearly all of us participate and perpetuate this system in some degree or another. But we can still use our sensibilities to regain and retain our connections to one another, to animals, to trees, to rivers. Think about the intense pain, violence, upheaval, disruption, and assaults upon habitats (to produce mines for metal and plantations) and upon people (to coerce them into labor), that industries compelled forth for the sake of the unnecessary production and sale of addictive substances such as sugar, coffee, chocolate, tea, and tobacco. How much “pleasure” makes all that suffering “worth it”? Often, addictions provide their own response in disabling people’s inherent sense of reason and empathy and clouding them with more distractions and/or intoxication. But we can break those cycles small bits at a time. This anthology has provided some ideas about how.

Sometimes groups have organized seemingly small gestures such as “Dry July” (e.g., abstaining from alcohol to raise awareness about cancer) or “Anti-Addiction Day” (e.g., to raise awareness in African American communities about the impacts of addiction):

Dry July is now only one of roughly two dozen events of its kind worldwide. [...] They share the important characteristics of being time-delimited, formally backed and often (but not exclusively) philanthropic campaigns that call on participants to totally abstain from alcohol. Most span only a single calendar month or a similarly short time frame, such as the forty days of Lent in the Christian calendar. [...] For my part, I call them Temporary Sobriety Initiatives (or TSIs) [...] Beyond the physiological, TSIs use the example of disuse to allow participants to discover more about alcohol’s resource implications, such as its impact on personal finances and its environmental costs (Robert 2022: 2).

Anti-Addiction Day seeks to raise the consciousness of African American faith communities to the devastating dangers, risks, and consequences of addictive behavior and habits broadly defined. The term “addiction” has been defined in many ways. It has been defined as “the state of being enslaved to a habit or practice or to something that is psychologically or physically habit-forming, as narcotics, to such an extent that its cessation causes severe trauma. Addiction is a physical or mental dependence on a behavior or substance that a person feels powerless to stop.” Another rendering is “an uncontrollable compulsion to repeat a behavior regardless of its negative consequences.” Finally, addiction designates “a process whereby a behavior, that can function both to produce pleasure and to provide escape from internal discomfort, is employed in a pattern characterized by (1) recurrent failure to control the behavior (powerlessness) and (2) continuation of the behavior despite significant negative consequences (unmanageability).”

Many of us who live in African American communities need little convincing that drug addiction and other “dependencies” are nearly pandemic in many African American communities. The plague of addiction in various forms is comparable for some in the faith community to idolatry in the Old Testament. Why idolatry? Perhaps, this analogy is adequate because in the life of the people of Israel, idolatry was the one communal “attraction,” “lure,” or “temptation” that caused the people to disassociate from their hard-won cultural and social values and also from their essential familial and religious commitments.

[...] It is imperative that the African American faith communities address the issue of addiction with social and cultural sensitivity to the historical and political forces and influences that have plagued and ravaged African American people as individuals and as a community. Also, while one cannot overlook the importance of individual responsibility in addiction and dependency, it is imperative that we also consider the social and political agendas that are served by keeping the African American community addicted and dependent. History has revealed the close relationship between addiction/dependency and control, not only of individuals but also of select group(s). For example, it is well-documented that in Antebellum America slavemasters carefully monitored the slaves’ access to alcohol. While they were prohibited from drinking under normal circumstances, they were encouraged to drink heavily on Saturday nights and holidays. Why during these times? When there was no work schedule to occupy them, alcohol was used as a means of social control and social management of emotions.

[...] Frederick Douglass, escaped slave, journalist, and noted spokesman for freedom, viewed such controlled promotion of drunkenness, even through such rituals as drinking contests, as a way to keep the slave in “a state of perpetual stupidity” and to “disgust the slave with his freedom.” [...] To be sure, Douglass was well aware of the collusion between addiction/dependency and social control and how important recovery and abstinence was for the communal and collective freedom of the African American community (Williams 2011).

One doesn’t have to commit to straight edge to abstain or moderate one’s addictions. One doesn’t have to spend years in prison liberating animals from their own prisons to quit eating meat or to oppose animal exploitation. Each person can figure it out eventually what they have as opportunities and goals. I just like to recall the framework within which we make all of our decisions. At the beginning of this book, I mentioned the loss

of 75% of total flying insect biomass. This book contains a lot of facts and statistics. But I want to select that one. Because that single fact gets so overlooked and means so much: industrial addictions contribute to the *mass extinctions of countless insects upon whom we all depend* (even if one somehow insanely did not attribute inherent value to insects on their own accord). From the study cited previously:

Loss of insects is certain to have adverse effects on ecosystem functioning, as insects play a central role in a variety of processes, including pollination, herbivory and detritivory, nutrient cycling and providing a food source for higher trophic levels such as birds, mammals and amphibians. For example, 80% of wild plants are estimated to depend on insects for pollination, while 60% of birds rely on insects as a food source. The ecosystem services provided by wild insects have been estimated at \$57 billion annually in the USA. Clearly, preserving insect abundance and diversity should constitute a prime conservation priority. Current data suggest an overall pattern of decline in insect diversity and abundance. For example, populations of European grassland butterflies are estimated to have declined by 50% in abundance between 1990 and 2011.

[...] Our results document a dramatic decline in average airborne insect biomass of 76% (up to 82% in midsummer) in just 27 years for protected nature areas in Germany. This considerably exceeds the estimated decline of 58% in global abundance of wild vertebrates over a 42-year period to 2012. Our results demonstrate that recently reported declines in several taxa such as butterflies, wild bees and moths [15–18], are in parallel with a severe loss of total aerial insect biomass, suggesting that it is not only the vulnerable species, but the flying insect community as a whole, that has been decimated over the last few decades (Hallmann *et al.* 2017: 1, 14).

Even if we only slowed—not stopped—the devastating expansion of industrial civilization, we would eventually kill off all insects. This does not include all of the other species of plants and animals on Earth subject to existential threats by systemic human addictions. Minds consumed by addiction-directed denial want to “solve” this problem by fabricating “robot insects” (such as mechanical “bees”) to do the ecological labor that real insects used to do before industry killed them off (Dorin 2020).

Addiction mentality seeks to use material technology to solve problems that would not even exist if we just faced our addictions. And yet, how do we face our addictions? Radical harm reduction seems one way to do it. Rather than trying to conquer addictions, we can, as Portugal did with hard drugs, de-stigmatize them in order to find healthier approaches to live our lives beyond the cycles of trauma → drugs → punishment → trauma → drugs (in 2001, Portugal decriminalized the personal use and possession of all illicit drugs with positive results). We can do this both personally (e.g., not blaming ourselves for our lapses, mistakes, habits, or “guilty pleasures”; by seeking out help and support from others) and also structurally (e.g., by changing laws, changing therapy forms, consuming less, and organizing resistance and against direct action against industries that perpetuate racist addiction).

So I end here with some comments from Maia Szalavitz who offers a personal-psychological approach to addiction yet which we could apply structurally. Significantly, Maia signals signs of hope and avenues for constructive change:

Indeed, today, more people than ever before see themselves as addicted or recovering from substance addiction: 1 in 10 American adults—more than 23 million people—said they’d kicked some type of drug or alcohol addiction in their lifetime, in a large national survey conducted in 2012. At least another 23 million currently suffer from some type of substance use disorder. That doesn’t even count the millions who consider themselves addicted to or recovering from behaviors like sex, gambling, or online activities—nor does it include food-related disorders. With the 2013 declaration by the American Medical Association that obesity, like addiction, is a disease, up to one in three Americans may now qualify due to their body weight (Szalavitz 2016: 2).

Critically, addiction is not created simply by exposure to drugs, nor is it the inevitable outcome of having a certain personality type or genetic background, though these factors play a role. Instead, addiction is a learned relationship between the timing and pattern of the exposure to substances or other potentially addictive experiences and a person’s predispositions, cultural and physical environment, and social and emotional needs. [...] Addiction is far less common in people who use drugs for the first time after age 25, and it often remits with or without treatment among people in their mid-20s, just as the brain becomes fully adult. In fact, 90% of all substance addictions start in adolescence, and most illegal drug addictions end by age 30.

The implications of the developmental perspective are far-reaching. For one, if addiction is a learning disorder, fighting a “war on drugs” is useless. Surprisingly, only 10-20% of those try even the most stigmatized drugs like heroin, crack, and methamphetamine become addicted. And that group, which tends to have a significant history of childhood trauma and/or preexisting mental illness, will usually find some way of compulsively self-medicating, no matter how much we crack down on one substance or another.

[...] Failing to recognize the true nature of addiction has also come at a catastrophic price. It prevents us from effectively tackling all types of drug problems, whether in terms of prevention, treatment or policy.

[...] Further, misunderstanding addiction allows drug policy to continue to be used as a political and racial football, since our ongoing use of ineffective tactics has produced widespread despair about affected people and families. In fact, however, research shows that, overall, addiction is the psychiatric disorder with the highest odds of recovery, not the worst prognosis—as many have been led to believe.

Addiction doesn’t just happen to people because they come across a particular chemical and begin to take it regularly. It is learned and has a history rooted in their individual, social, and cultural development.

[...] Properly understood, the addicted brain isn’t broken—it’s simply undergone a different course of development. Like ADHD or autism, addiction is what you might call a wiring difference, not necessarily a destruction of tissue, although some doses of some drugs can indeed injure brain cells. While, like anything else that is learned, addiction may get more engrained with time, people actually have increased odds of recovery as they age, not reduced chances. This apparent paradox makes much more sense if seen as part of a developmental disorder that can change with life stages. [...] Changing behavior is far easier if you use social support, empathy, and positive incentives, as a great deal of psychology research—though often ignored in addiction treatment and policy—demonstrates (Szalavitz 2016: 4-6).

Likewise, we do not need to see the oppressive system that we live in as “broken” or “evil.” We can recognize that humans run this system, often against their better judgment or natural inclinations toward empathy. But each human suffers in some way from the cycles of denial, pain, fear, and desire to numb the pain and escape the discomfort, whether in psychic or physical senses. So we can take small steps. For “white” people, one clear step seems relatively easy: acknowledging that treason to “whiteness” functions as a key step toward dismantling the racist colonialist system of addiction and violence toward nature and ourselves. When “white” people take that step, they can join the rest of the world in dealing with our shared burdens in a more equal fashion. It may feel difficult and it may seem futile but miracles happen... sometimes with a proper nudge.

This anthology has aimed to provide one such nudge. Legal and illegal industries of addiction (with universities, journalists, and academics as their witting or unwitting accomplices) suffocate knowledge, eco-systems, and potential solutions with toxic and arbitrary cages of profit-making enterprise. If we act outside those boxes and their rules by sharing information and research across borders then maybe we can discover new solutions together (or re-discover/re-apply old solutions).

It turns out that recent research has lent support to the predisposition of Bruce Wilshire and countless indigenous people before him: a constant sense of awe before nature helps bind us to balance (e.g., Bai et al. 2017; Isham *et al.* 2022; Jiao and Luo 2022). It can *re-locate* us. By experiencing the humility of our cellular existence immersed in and bound to a larger communal, ecological, Earthen, and universal body, we might grasp our power, direction, coordination, and destiny. Not just understanding intellectually that we belong to a larger Whole but *feeling* it and allowing it to *move* us.

Our circumstances compel us to act now. But we tend to procrastinate, do we not? Do we *now* recognize procrastination itself as a sign of addiction and larger problems of denial and defeatism?¹³⁶ Maybe we let our past offer a clumsy guide to our future. Maybe we have already given up, tell ourselves that our tiny actions don’t matter, believe the lies that addictive behavior produces to protect itself. But if we have the power to *choose otherwise* then we only fully know it when we exercise it.

Facing addiction and its relationship to ecology can reveal how much opportunity we actually have in small details to re-capture aspects of our own lives and join with others to establish or support healthier social norms, habits, rituals, and organizations. Understanding the role of WRACE means noting the original source of addiction: civilizational detachment from animals, nature, and healthy community. It means acknowledging the racist design and effects of the so-called “War on Drugs” and seeing that WRACE-ism, not “humans” per se, wrecks our planet. It means embracing the fact that we each, in some small way, can “take the power back” to reveal, repeal, and heal our wounded psyches and sick system back to balance with the animals, natural habitats, and human connections that give us our hope, our health, and our future.

¹³⁶ See, for example, Ali Asghar Hayat, Javad Kojuri, and M. D. Mitra Amini, “Academic procrastination of medical students: The role of Internet addiction,” *Journal of Advances in Medical Education & Professionalism* 8, no. 2 (2020): 83-89; Jinha Kim, *et al.*, “Effects of time perspective and self-control on procrastination and Internet addiction,” *Journal of Behavioral Addictions* 6, no. 2 (2017): 229-236; and Arminda Suárez-Perdomo, Zuleica Ruiz-Alfonso, and Yaritza Garcés-Delgado, “Profiles of undergraduates’ networks addiction: Difference in academic procrastination and performance,” *Computers & Education* 181 (2022): 1-10.

References

- Alaniz, Maria Luisa and Chris Wilkes. "Pro-Drinking Messages and Message Environments for Young Adults: The Case of Alcohol Industry Advertising in African American, Latino, and Native American Communities." *Journal of Public Health Policy* 19, no. 4 (1998): 447-472.
- Alexander, Michelle. *The New Jim Crow: Mass Incarceration in the Age of Colorblindness*. New York: The New Press, 2011a.
- Alexander, Michelle. "The New Jim Crow." *Ohio State Journal of Criminal Law* 9 (2011b): 7-26.
- Bai, Y., Maruskin, L. A., Chen, S., Gordon, A. M., Stellar, J. E., McNeil, G. D., Peng, K., & D. Keltner. "Awe, the diminished self, and collective engagement- Universals and cultural variations in the small self." *Journal of Personality and Social Psychology* 113, no. 2 (2017): 185-209.
- Barr, Donald. *Health Disparities in the United States: Social Class, Race, Ethnicity, and Health*. Baltimore: Johns Hopkins University Press, 2008.
- Bhatt, R. V. "Domestic Violence and Substance Abuse." *International Journal of Gynecology & Obstetrics* 63 (1998): S25-S31.
- Brook, Daniel. "Environmental Genocide: Native Americans and Toxic Waste." *American Journal of Economics and Sociology* 57, no. 1 (1998): 105-113.
- Bullard, Robert D. "Environmental Justice: Once a Footnote, Now a Headline." *Harvard Environmental Law Review*. 45, no. 2 (2021): 243-248.
- Carrington, Damian. "Indigenous peoples by far the best guardians of forests – UN report." 25 March 2021. <https://www.theguardian.com/environment/2021/mar/25/indigenous-peoples-by-far-the-best-guardians-of-forests-un-report>
- Chapman, Nathaniel G., and David L. Brunsma. *Beer and Racism: How Beer Became White, Why It Matters, and the Movements to Change It*. Bristol University Press, 2020. 103-130.
- Davis, Tomeka M., and Adria N. Welcher. "School quality and the vulnerability of the Black middle class: The continuing significance of race as a predictor of disparate schooling environments." *Sociological Perspectives* 56, no. 4 (2013): 467-493.
- Dorin, Alan. "The Problem with Robobees." *The Biologist*. 2 December 2020.
- Evans, William N. and Julie H. Topoleski. "The Social and Economic Impact of Native American Casinos." NBER Working Paper No. 9198 (2002): 1-66.
- Ewing, Eve L. *Ghosts in the Schoolyard: Racism and School Closings on Chicago's South Side*. Chicago and London: University of Chicago Press, 2018.
- Gertten, Fredrik. *Bananas*. Documentary film. WG Film. 2009.
- Gonzalez, Carmen. "Climate Change, Race, and Migration." *Journal of Law and Political Economy* 1, no. 1 (2020): 109-146.
- Granfield, Robert. "Addiction and Modernity: A Comment on a Global Theory of Addiction." *Nad Publication* 44 (2004): 29-34.
- Hall, A. V., E. V. Hall, and J. L. Perry. "Black and Blue: Exploring Racial Bias and Law Enforcement in the Killings of Unarmed Black Male Civilians." *American Psychologist*, 71, no. 3 (2016): 175-186.

- Hallmann, Caspar A., *et al.* “More than 75 percent decline over 27 years in total flying insect biomass in protected areas.” *PLoS One* 12, no. 10, 2017: 1-21.
- Harris, J.C., *et al.* “Racial Differences in the Association Between Alcohol Drinking and Cigarette Smoking: Preliminary Findings From an Alcohol Research Program.” *Alcohol and Alcoholism* 57, no. 3 (2022): 330-339.
- Hickman, Timothy A. “Drugs and Race in American Culture: Orientalism in the Turn-of-the-Century Discourse of Narcotic Addiction.” *American Studies* 41, no. 1 (2000): 71-91.
- Hoover, Elizabeth, *et al.* “Indigenous peoples of North America: Environmental exposures and reproductive justice.” *Environmental Health Perspectives* 120, no. 12 (2012): 1645-1649.
- HRW. *Decades of Disparity: Drug Arrests and Race in the United States*. New York: Human Rights Watch, 2009.
- Huang, Jon, Claire O’Neill, and Hiroko Tabuchi. “Bitcoin Uses More Electricity Than Many Countries. How Is That Possible?” *New York Times*. 3 September 2021. <https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html>
- Huezo, Alexander. “Contested Natures: Coca, the War on Drugs, and Ecologies of Difference in Colombia’s Afro-Pacific.” *Journal of Political Ecology* 26, no. 1 (2019): 305-322.
- Institute of Medicine of the National Academies. *State and Local Policy Initiatives to Reduce Health Disparities*. Washington DC: National Academies Press, 2011.
- Isham, Amy, Patrick Elf, and Tim Jackson. “Self-transcendent experiences as promoters of ecological wellbeing? Exploration of the evidence and hypotheses to be tested.” *Frontiers in Psychology* 13 (2022): 1-20.
- Jiao, Liming and Li Luo. “Dispositional Awe Positively Predicts Prosocial Tendencies: The Multiple Mediation Effects of Connectedness and Empathy.” *International Journal of Environmental Research and Public Health* 19, no. 24 (2022): 1-10.
- Jonathan. *One for the Resistance? Oppression, Anarchism and Alcohol*. Zabalaza Books, 2008.
- Kaysen, Debra, *et al.* “Domestic Violence and Alcohol Use: Trauma-related Symptoms and Motives for Drinking.” *Addictive Behaviors* 32, no. 6 (2007): 1272-1283.
- Knight, Michael Muhammad. *Tripping with Allah: Islam, Drugs, and Writing*. Berkeley: Soft Skull, 2013.
- Matthew, Dayna Bowen. *Just Medicine: A Cure for Racial Inequality in American Health Care*. New York: NYU Press, 2018.
- Mazibuko, Nokuthula Caritus and Ikechukwu Umejesi. “Blame it on Alcohol: ‘Passing the buck’ on Domestic Violence and Addiction.” *Multidisciplinary Journal of Gender Studies* 4, no. 2 (2015): 718-738.
- McKee, P., *et al.* “Malt liquor marketing in inner cities: the role of neighborhood racial composition.” *Journal of Ethnicity and Substance Abuse* 10, no. 1 (2011): 24-38.
- Merchant, Carolyn. *Radical Ecology: The Search for a Livable World*. New York and London: Routledge, 2005.
- Mills, Evan. *Energy Up In Smoke: The Carbon Footprint of Indoor Cannabis Production*. 2011. <https://sites.google.com/site/millsenergyassociates/topics/energy-up-in-smoke>

- Mills, Evan. From Green Rush to Green-wash: A laundry list of greenwashing behaviors from the cannabis industry. 2022. <https://sites.google.com/site/millsenergyassociates/topics/energy-up-in-smoke/from-light-green-to-greenwashing>
- Myhra, Laurelle L. “‘It Runs in the Family’: Intergenerational Transmission of Historical Trauma among Urban American Indians and Alaska Natives in Culturally Specific Sobriety Maintenance Programs.” *American Indian and Alaska Native Mental Health Research* 18, no. 2 (2011): 17-40.
- Oji, Karachi Benson and Emmanuel Ezimako Nzeaka. “Digital Colonialism on Digital Natives in Nigeria: A WhatsApp Usage Perspective.” *New Media and Mass Communication* 86 (2019): 35-49.
- Robert, Julie. *Alcohol, Binge Sobriety and Exemplary Abstinence*. London: Bloomsbury Publishing, 2022.
- Robinson, Donald W. “Sexual addiction as an adaptive response to posttraumatic stress disorder in the African American community.” *Sexual Addiction & Compulsivity: The Journal of Treatment and Prevention* 6, no. 1 (1999): 11-22.
- Smith, Andrea. “Malthusian orthodoxy and the myth of ZPG- Population control as racism.” In: Jace Weaver (ed). *Defending Mother Earth: Native American Perspectives on Environmental Justice*, 122-143. Maryknoll, NY: Orbis books, 1996.
- Szalavitz, Maia. *Unbroken Brain: A Revolutionary New Way of Understanding Addiction*. New York: St. Martin’s Press, 2016.
- Tonry, M. “Race, Ethnicity, and Punishment.” In: K. Reitz and J. Petersilia (eds.), *Oxford Handbook of Sentencing and Corrections*, 53-81. New York: Oxford University Press, 2012.
- Troyna, Barry, ed. *Racial Inequality in Education*. London: Tavistock Publications, 2012.
- US Dept. of Justice. *Drug Use, Dependence, and Abuse Among State Prisoners and Jail Inmates, 2007-2009*. 2017 (revised 2020). <https://bjs.ojp.gov/content/pub/pdf/dudaspi0709.pdf>
- Walvin, James. *Slavery in Small Things: Slavery and Modern Cultural Habits*. West Sussex: John Wiley & Sons, 2017.
- Wailoo, Keith. “How the Tobacco Industry Hooked Black Smokers on Menthols.” *New York Times*, 11 May 2022.
- Warde, Bryan. “Why Race Still Matters 50 years After the Enactment of the 1964 Civil Rights Act.” *Journal of African American Studies* 18, no. 2 (2014): 251-259.
- WHO. “Violence Against Women.” World Health Organization. 2021. <https://www.who.int/news-room/fact-sheets/detail/violence-against-women>
- Williams, Demetrius K. “Anti-Addiction Day.” 2011.
- Zhong, Raymond and Nadja Popovich. “How Air Pollution Across America Reflects Racist Policy From the 1930s.” *New York Times*. 2 March 2022. <https://www.nytimes.com/2022/03/09/climate/redlining-racism-air-pollution.html>

